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四川乌头属的修订

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Taxonomic revision of *Aconitum* (Ranunculaceae) from Sichuan, China

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Abstract Taxonomy of the genus *Aconitum* L. from Sichuan, SW China, was revised. Based on literature survey, extensive field and herbarium observations, morphological variations shown within and between populations in the genus from Sichuan were studied. The taxonomic significance of the major gross morphological characters was evaluated. The degree of leaf division, the shape of upper sepal and pedicel pubescence are found to be the most reliable diagnostic characters for the circumscription of species, although sometimes even these characters are variable within and between populations of the same species and change greatly with environmental conditions. The petal and seed morphology can provide characters useful for infrageneric division. Forty-six species and 11 varieties of *Aconitum* are recognized from Sichuan. Two species (*A. potaninii* Kom. and *A. limprichtii* Hand.-Mazz.) and one variety (*A. handelianum* var. *laxipilosum* Hand.-Mazz.) are numerated as dubious taxa because of the unavailability of their type specimens for examination. Twenty-nine species and 22 varieties are reduced to synonymies. Two new combinations, *A. legendrei* var. *albovillosum* (Chen & Liu) Y. Luo & Q. E. Yang and *A. liljestrandii* var. *fangianum (*W. T. Wang) Y. Luo & Q. E. Yang, are proposed. Two species, *A. delavayi* Franch. and *A. nagarum* Stapf, are newly recorded from Sichuan. Three species, *A. tatsienense* Finet & Gagnep., *A. henryi* Pritz. and *A. refractum* (Finet & Gagnep.) Hand.-Mazz. are lectotypified. The identity of *A. tongolense* Ulbr. and *A. refractum* was clarified. Description, distribution and a key to the subgenera, series and species are given.

Key words *Aconitum*, Sichuan, taxonomic revision.

摘要 四川是我国乌头属*Aconitum* L.植物的重要分布区。本文对该地区的乌头属植物进行了分类修订。通过文献查阅、野外观察和标本室研究,对乌头属的形态性状在居群间和居群内的变异式样进行了比较分析,发现叶分裂程度、上萼片的形状和花梗毛被等性状是较为可靠的分种依据,但是在个别情况,这些性状也会在同一种的同一居群内或不同居群间发生变化。花瓣和种子的特征对于属下划分有重要意义。本文承认四川乌头属植物有46种11变种,另有2种和1变种暂存疑。29种和22变种降为异名;作出新组合2个,其中包括1个改级新组合。紫乌头*A. delavayi* Franch.和保山乌头*A. nagarum* Stapf为四川新分布记录。对康定乌头*A. tatsienense* Finet & Gagnep.、川鄂乌头*A. henryi* Pritz.和狭裂乌头*A. refractum (*Finet & Gagnep.) Hand.-Mazz.进行了后选模式的标定。初步澄清了东俄洛乌头*A. tongolense* Ulbr.和狭裂乌头等

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种类中长期存在的名实混乱。还给出了各个种的形态描述、地理分布以及分亚属、分系和分种检索表。
关键词 乌头属; 四川; 分类修订

1 分类简史及存在的问题

分类学家对乌头属*Aconitum* L.植物的认识已有很长的历史。Linnaeus 1753年在其名著《植物种志》(Species Plantarum)中记载了本属5个种。根据国际植物命名法规,此为本属的有效发表。

对于四川乌头属的研究可能始于1904年,Finet和Gagnepain对中国分布的一些乌头种类进行了研究,发表了一些新种,其中涉及的四川分布的种有康定乌头*A. tatsienense* Finet & Gagnep.和大渡乌头*A. franchetii* Finet & Gagnep.等。此后,Ulbrich(1915)、Handel-Mazzetti(1931, 1939)、Fletcher和Lauener(1950)等陆续研究了四川乌头属植物。其中对国产乌头属植物的分类研究作出巨大贡献的是Handel-Mazzetti,他1939年在Acta Hort. Gotob. 13卷上主要根据Harry Smith采集的标本,发表了许多四川的新种,并对中国产的乌头属植物进行了较详细的研究。该文可以看作当时国产乌头属的专著,其中共记载我国乌头属植物76种,四川分布的种约有42种4变种,包括15个新种。

我国最早研究四川乌头属的学者是陈封怀和刘瑛。1941年,他们在《静生生物调查所汇报》(Bulletin of the Fan Memorial Institute of Biology)首先发表了《云南西北部乌头之研究》(Chen & Liu, 1941);陈封怀1943年发表了《中国西部毛茛科之研究》一文(Chen, 1943)。两文均涉及了一些四川分布的乌头属植物。对我国乌头属植物研究最为深入的当属王文采先生,他对国产乌头属植物进行了全面和系统的整理,共记载了161种,隶属于3个亚属、4个组和21个系,发表了许多主要采自云南、四川及西藏等地的32个新种和30个新变种(王文采, 1965)。1979年,在《中国植物志》27卷中,他对1965年的分类处理进行了一些修订,共记载167种,其中包括20个新种和13个新变种;对分类系统也做了调整,将乌头属分为3个亚属4个组11个系,其系统变动较大的地方主要体现在系的划分上。后来他又陆续在以《中国毛茛科植物小志》为题的系列文章中发表了一些四川乌头属植物新种(王文采, 1980, 1984)。他的工作为我国乌头属植物的分类研究奠定了基础。

近年来有一些学者对四川乌头属进行了进一步的分类研究。杨亲二(1999)对云南分布的乌头属植物进行了订正,其中涉及了一些与四川地区相关的种类, 日本学者Kadota(1999) 也对四川分布的乌头属植物开展了一些分类研究。

至止,四川已记载乌头属种类共计有73种33变种。

乌头属是一个分类上十分困难的类群,不但属下特别是亚属下的系统难以划分,种的划分也常难以把握;其性状变异非常复杂而且彼此常常缺少相关性;许多所谓的“种”仅仅是一些极端变异类型或中间类型。另外由于仅有一些区域性的工作而缺少世界性的专著,也阻碍了乌头属的系统学研究。尽管前人对乌头属进行了较为详细的研究,积累了十分丰富的资料,但对该属的属下分类和许多种类的界定一直没有达成共识。从我国乌头属研究的现状来看,这个属在分类上仍存在一些问题:许多种和变种仅仅依据一两份标本建立,没有经过详细的野外调查,对一些性状的变异幅度认识不够;属内仍存在许多同物异名、名实不符的分类学问题;亚属下组和系的划分,各家观点颇为不同。

鉴于目前在乌头属植物的分类上存在的这些问题,本文将文献考证、标本室研究和野外观察结合起来,对四川乌头属植物的分类进行了力所能及的修订。所引证的标本存放在如下标本室:中国科学院昆明植物研究所标本馆(KUN),中国科学院成都生物研究所标本馆 (CDBI),中国医学科学院药物研究所标本馆(M),江苏植物研究所标本馆(NAS),四川大学生物系植物标本室(SZ),重庆中药研究院标本馆(MS),重庆药品检验所标本室(MCH),四川凉山州药品检验所植物标本室(LSDC),英国邱皇家植物园标本馆(K),英国爱丁堡皇家植物园标本馆(E),法国巴黎自然历史博物馆显花植物标本室(P),美国哈佛大学Gray标本馆(GH),奥地利维也纳大学植物研究所和植物园标本室(WU)。凡未注明存放地点者,均藏于中国科学院植物研究所国家标本馆(PE)。

2　形态性状及其分类价值

要做好乌头属植物的分类,首先取决于选取哪些性状进行分类。即使是通常相当稳定而重要的分类性状,也不能据以完全保险地用来鉴定每一份标本,只有对每个种的性状变异幅度及变异规律有较全面的了解后,才可能最大限度地避免错误鉴定。为免受前人及主观上的影响,我们将注意力放在尽可能多的性状上,以期发现被其他研究者忽视而实际上很重要的分类性状。我们试图对尽可能多的种类特别是一些疑难种类的居群内各性状的变异幅度进行仔细分析,同时也注意考察各性状在居群间的变异幅度,以期较清楚地了解性状在居群内和居群间的变异式样。我们认为,如果能对各个种的一些重要性状的变异幅度及其间断进行细致的分析,并结合地理分布资料,对乌头属的种类划分将较为符合实际情况。下面将逐个讨论乌头属的主要形态性状在种内和种间的变异式样及其分类学价值。

2.1　习性

除单型亚属露蕊乌头亚属subgen. *Gymnaconitum* (Stapf) Rapaics的露蕊乌头*A. gymnandrum* Maxim.为具直根系的一年生草本外,乌头属的其他两个亚属均为多年生草本或草质藤本。其中牛扁亚属subgen. *Lycoctonum* (DC.) Peterm.具多年生根状茎;乌头亚属subgen. *Aconitum*具二年生块根,母根旁边通常能长出一个甚至几个子根,故就整个植物体而言,仍然是多年生的。

2.2　地下部分

地下部分在乌头属的亚属划分上具有重要意义。乌头属主要根据地下部分划分为3个自然的亚属,即牛扁亚属具多年生根状茎,乌头亚属具二年生块根,露蕊乌头亚属具一年生直根。多数学者认为乌头属地下部分的演化趋势是从多年生根状茎→二年生块根→一年生直根,因而认为牛扁亚属是比较原始的类群,而露蕊乌头亚属演化水平较高(Tamura, 1966; 王文采, 1979)。

乌头亚属植物块根的形状和颜色有时也用作分类的性状,尤其用在中药材的鉴定上。对某些种而言,地下部分具有比较稳定的形状,如生长于高山草甸的美丽乌头*A. pulchellum* Hand.-Mazz.和甘青乌头*A. tanguticum* (Maxim.) Stapf等具球状的块根而与生长于林间的大渡乌头和瓜叶乌头*A. hemsleyanum* Pritz.等的胡萝卜形块根显著不同。分布于新疆的准噶尔乌头系ser. *Grandituberosa* Steinb.的几个种具有独特的链状的子根。

有时块根在大小和形状上在种间会有较大的变化,大小受生境影响很大,且与地上部

分的大小密切相关。块根上的子根通常为一个,但如果营养条件较好,子根数目也会相应增多,如生长旺盛而粗壮的瓜叶乌头,子根往往可达3-5个。栽培的药用乌头(附子)*A. carmichaeli* Debx.子根数目更多。

2.3 茎

根据茎的形态,乌头属植物可分为直立者和藤本者,王文采(1965,1979)曾据此将藤本习性的乌头亚属植物归为蔓乌头系ser. *Volubilia* Steinb.。他认为藤本类乌头可能有共同的起源,但我们在野外观察到,茎的形态受生境的影响变异很大。生长于较开阔的环境,如草甸或林缘的种类,茎较低矮,直立;生长于林内或灌丛间的种类,茎则较长且具有显著的缠绕习性。有的种类茎下部直立而上部披散成缠绕状;有的种类在茎上部生出很多柔软缠绕的披散分枝,因此有时从标本上甚至难以分辨出茎究竟是直立的还是攀援的。有的植物就是基于这一特征而被描述为两个不同的种,即一个直立的种和一个攀援的种。因此,在把茎的生长习性作为分类鉴别特征时,必须十分谨慎,同时在种的习性的描述时也应该加以注意。

当然,虽然如上所述,茎的形态有时在同一种内有很大的变异,但在有些种也是相当稳定的,如瓜叶乌头、蔓乌头*A. volubile* Pall.和弯喙乌头*A. campylorrhynchum* Hand.-Mazz.等都为较典型的藤本种。这是因为在自然条件下,同一种植物往往生长于比较一致的生境。虽然有些例外,但一般茎直立者多生长于较开放的生境,如高山草甸或亚高山林间草甸,而茎缠绕者多生长于较封闭的环境,如林下或灌丛中,所以茎的形态在有些类群中仍不失为一个有用的分类性状。

茎上分枝的多少也被有的分类学家用作区分类群的依据,如展枝康定乌头*A. tatsienense* var. *divaricatum* (Finet & Gagnep.) W. T. Wang与原变种康定乌头的区别就在于茎中部以上有较多较长的分枝。我们在野外观察到,乌头属植物上部分枝的情况在显柱乌头系ser. *Stylosa* W. T. Wang和兴安乌头系ser. *Ambigua* Steinb.中是较为普遍的,一般生长在林下或林间的种类,水分给养充足时往往其茎的上部就会有分枝。因此我们认为茎上分枝的多少及其长短一般不能作为分类的依据,展枝康定乌头应该归并(详见下一节分类处理)。

2.4 叶

叶的特征在乌头属中变化较大,因而引起研究者关注。不少作者的错误鉴定是由于把握不住其变异幅度所造成的。本属内的叶都为单叶,叶片一般都有不同程度的分裂 (个别种如菱叶乌头*A. rhombifolium* Chen的叶不分裂),叶形有圆形、肾形或五角形等,有较大的种间和种内变化。

叶的分裂程度一般在种内较为稳定,因此在乌头属植物分类中有较重要的价值,是乌头属中最为可靠的分类性状之一。乌头属植物的叶依分裂程度可分为掌状深裂和掌状全裂。王文采(1979)认为叶的分裂程度有重要的系统发育意义,其演化趋势为掌状深裂→掌状全裂→细裂。我们发现在叶掌状深裂和掌状全裂之间有很多过渡状态,描述时有时难于把握。如“叶近全裂”、“叶裂至叶基部几厘米”等的描述在实际应用中存在一定的困难。只有对这一性状进行全面考察,了解其变异幅度后,才能较好地使用该性状进行分类。

叶一回裂片的形状、分裂程度等性状变异幅度很大,有时可作为鉴别种的特征,但有时在同一种内甚至同一植株内也有很大差异。因此在利用这些性状时也要注意全面考察。

叶柄的长短在有些类群中比较稳定,如短柄乌头系ser. *Brachypoda* W. T. Wang的种类叶通常密集,生长于茎中部至上部,有短柄或近无柄,但这个性状有时也有种内变异,不能单独作为分类的依据,还要结合其他性状的变异式样,具体情况作具体分析。

2.5 珠芽

本属植物中具藤本习性的乌头有时会在茎的叶腋处产生珠芽,产生珠芽是乌头属的一种营养繁殖方式。这个性状常常表现出较大的居群内变异,分类价值不大(杨亲二, 1999)。但在四川会理和米易一带分布的珠芽乌头*A. bulbilliferum* Hand.-Mazz.在外部形态上与瓜叶乌头很相似,但其叶腋内都有形态和数目各异的珠芽,我们的野外观察和Handel-Mazzetti(1939)的记载是相符的,说明该种具有珠芽这一特征是比较稳定的,而瓜叶乌头本身产生珠芽的性状在居群内或居群间都不稳定。这一事实说明珠芽的产生在一些种类中可能与生境有关。

2.6 花序

乌头属植物的花序通常为总状、圆锥状或伞房花序,有时花单生。花序的类型通常没有分类价值。

2.7 花梗

花梗的长短及其生长方向有较大的居群间和居群内的变异,其分类价值颇难把握。

花梗的毛被通常被视为乌头属中最重要的分类性状之一。很多学者,包括Handel-Mazzetti (1939)、Nakai (1953)、Tamura (1966)、王文采(1979)、Kadota (1987)和杨亲二(1999) 等,在进行乌头属植物的分类时,都很重视花梗毛被的类型,甚至将其作为推测杂交起源的重要证据(Kadota, 1987)。乌头属中花梗被毛的情况主要有3种:无毛、被直立伸展的毛和被卷曲贴伏的毛。在扫描电镜下,直立伸展的毛表面平滑,而卷曲贴伏的毛表面粗糙(Kadota, 1987; 杨亲二, 1990)。直立伸展的毛中有时顶端有一小突起而为腺毛 (杨亲二, 1990)。在通常情况下,该性状在居群间和居群内都保持着相对的稳定性,确实可以作为分类的重要特征。但是也有一些类群,其毛被性状却表现了极为复杂的变异。如我们在理县鹧鸪山观察到的刷经寺乌头*A. liljestrandii* Hand.-Mazz. var. *fangianum* (W. T. Wang) Y. Luo & Q. E. Yang居群,花梗毛被表现了多种变异,在居群间和同一居群内的变化都很大。花梗无毛、花梗被开展毛和花梗被卷曲毛的个体混杂在一起。过去将这些不同毛被类型的个体描述为不同的种类。我们在云南中甸红山的一个冯氏乌头*A. fengii* W. T. Wang居群中也发现花梗毛被表现出同样的情况。另外还有一些乌头属植物在同一花梗上开展毛和卷曲毛混杂在一起,Kadota(1987)推断这是杂交的结果。

2.8 小苞片

小苞片着生在花梗基部、中部和上部或与花邻接,通常为线形、条形、匙形、长圆形和卵形等。其形状和着生位置被许多作者用作分类性状。我们在检查标本时也进行了观察和统计,发现在有些种类,小苞片的形状和位置在种内是稳定的,在分类和鉴定上有一定的价值,如巨苞岩乌头*A. racemulosum* var. *grandibracteolatum* W. T. Wang具较大的宽卵形小苞片而与原变种相区别;而在多数种里面,小苞片的性状不好把握,它在不同的居群或同一个居群甚至在同一个植株上都有变化,通常在花序轴下部,小苞片多少叶状,上部的逐渐变小成条形、线形。

2.9 花

乌头属植物的花结构如图1A所示。

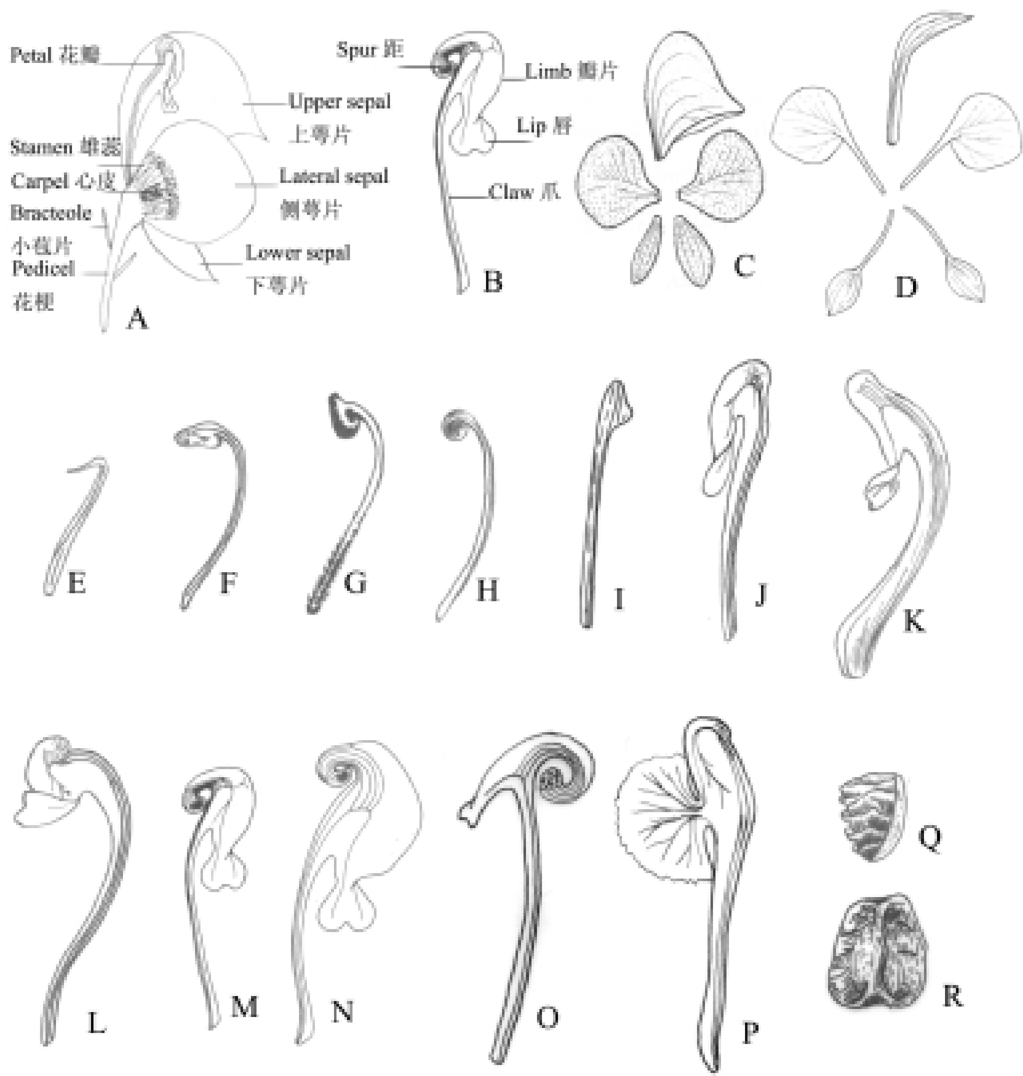


图1 乌头属植物花的结构和种子类型 **A.** 花部结构。**B.** 花瓣结构。**C, D.** 花萼。**C,** 膝瓣乌头; **D,** 露蕊乌头。**E-P.** 花瓣的不同式样。**E,** 钩瓣乌头; **F,** 甘青乌头; **G,** 多果乌头; **H,** 螺瓣乌头; **I,** 独花乌头; **J,** 黄毛乌头; **K,** 小白撑; **L,** 冕宁乌头; **M,** 瓜叶乌头; **N,** 川鄂乌头; **O,** 花葶乌头; **P,** 露蕊乌头。**Q, R.** 种子。**Q,** 种子一面生有横膜翅, 苍山乌头; **R,** 种子不具横膜翅, 褐紫乌头。

Fig. 1. The structure of flower and the seed types of *Aconitum*. **A,** the structure of flower in *Aconitum*. **B,** the structure of petal in *Aconitum*. **C, D,** sepals of *Aconitum*. **C,** *A. geniculatum* Fletcher & Lauener; **D,** *A. gymnandrum* Maxim. **E-P,** different petal patterns in *Aconitum*. **E,** *A. hamatipetalum* W. T. Wang; **F,** *A. tanguticum* (Maxim.) Stapf; **G,** *A. polycarpum* Chang ex W. T. Wang; **H,** *A. spiripetalum* Hand.-Mazz.; **I,** *A. fletcheranum* G. Taylor; **J,** *A. chrysotrichum* W. T. Wang; **K,** *A. nagarum* var. *acaule* (Finet & Gagnep.) Q. E. Yang; **L,** *A. legendrei* Hand.-Mazz.; **M,** *A. hemsleyanum* Pritz.; **N,** *A. henryi* Pritz.; **O,** *A. scaposum* Franch.; **P,** *A. gymnandrum*. **Q, R,** seeds of *Aconitum*. **Q,** seed with transverse lamellae, *A. contortum* Finet & Gagnep.; **R,** seed without transverse lamellae, *A. brunneum* Hand.-Mazz.

2.9.1 花萼 乌头属植物的萼片宿存,依靠其鲜艳的颜色吸引昆虫授粉。萼片通常5个,上萼片1,呈盔状,侧萼片和下萼片各2,依次减小(图1:C,D)。上萼片的形状有重要的分类价值,通常有船形、盔形、高盔形等。但是上萼片的这几种形状之间有时也并不是严格可分的,因为没有严格的标准去界定,所以有时很难准确定义其形状,从而造成了描述这个性状的困难。上萼片的形状在种内能够保持较好的稳定性,有较大的种间变异,可作为分种的重要依据。有时也在属下分类体现一定的价值(王文采, 1979), 如在显柱乌头系里,上萼片多为盔形而少见船形,蔓乌头系里的种类多为圆筒状高盔形。王文采(1979)指出上萼片的形状还具有重要的系统演化意义,认为其演化趋势是船形→盔形→高盔形→圆筒形。侧萼片通常倒卵形或长圆形,边缘有缘毛。下萼片近长圆形,有时不等大。侧萼片和下萼片一般在种间变异不大,通常不作为分类的依据。萼片的颜色通常为蓝紫色、紫色、蓝色、淡蓝色、紫红色、暗紫色,少数为黄色、黄绿色和白色。花色有时被有些作者作为划分变种或变型的依据。但据我们的野外观察,除了黄色这一颜色外,花色在不同的地理环境和生境会有变化,如花葶乌头*A. scaposum* Franch.的花通常为紫色,但我们在理县观察到有白色花的居群;铁棒锤*A. pendulum* Busch花色变化也很大,暗紫色、蓝紫色和淡蓝色的花在野外都可观察到。

2.9.2 花瓣 乌头属植物的花瓣2枚,通常与萼片同色,特化为分泌器官,由爪、瓣片、唇和距组成(图1:B,L-P),但有的种花瓣分化不完全,无明显的唇和距的分化(图1:E-K)。花瓣特征的变化主要表现在唇和距形态的变化。唇和距的形态在种内通常具稳定性,具有重要的分种价值,也是属下分类的重要依据(王文采, 1979)。但在有些种,距的长短或有无在居群内也有变化,如凉山乌头*A. liangshanicum* W. T. Wang的距的有无在同一植株上都有变化。花瓣被毛的情况有时也较稳定,如在雅江分布的毛瓣乌头*A. pilopetalum* W. T. Wang & L. Q. Li花瓣的爪部密被柔毛可与近缘种区别。另外一些性状,如爪顶端膝状弯曲与否曾经被作为分种的依据,但根据标本室研究和野外观察,这一性状在居群内和居群间都不稳定,不能作为分类的依据。花瓣的数目有时也会发生变异。在稻城产的狭裂乌头*A. refractum* (Finet & Gagnep.) Hand.-Mazz.中,我们在居群内寻找到了3或4枚花瓣的畸形花。

2.9.3 雄蕊 雄蕊数目多数不定,花丝下部通常有翅。以前的一些作者认为花丝的翅在鉴定上十分重要,它的全缘或具齿和有无毛被可作为鉴定指标。在我们观察的种类中,花丝的特征没有大的差别,花丝全缘或具齿的性状在同一朵花里都可观察到,其分类价值不大。

2.9.4 心皮 通常3-5,有时8-9。心皮数目有时在同一种的居群间和居群内会有变化,但在有些种心皮数目较稳定,具有一定的分类价值。心皮被毛特征的稳定性也不好把握,有的种相对稳定,有的种也存在居群间和居群内的变化。

2.10 种子

本属植物的种子通常为四面体形,有棱,生有不同类型的翅。大致可分为两种类型, 种子无横膜翅(图1:R),或种子在一面生有横膜翅(图1:Q)。种子形态在种内保持较好的稳定性,虽然种间的变化也不大,但它可作为属下分类的重要依据(王文采, 1979; Tamura, 1995)。

3 分类处理

乌头属

Aconitum L., Sp. Pl., ed. 1, 1: 532. 1753; et Gen. Pl., ed. 5. 236. 1754; DC., Syst. Nat. 1:

364. 1818; Stapf in Ann. Roy. Bot. Gard. Calc. 10: 133. 1905; Rapaics in Növ.Közl. 6: 136. 1907; Steinb. in Kom., Fl. URSS VII: 183. 1937; Hand.-Mazz. in Acta Hort. Gotob. 13: 81. 1939; Worosch. in Bot. Zhurn. SSSR 30: 125. 1945; W. T. Wang in Fl. Reip. Pop. Sin. 27: 113. 1979; Tamura in Hiepko, Natür. Pflanzenf., zweite Aufl., 17a (4): 274. 1995.

Lectotype: *Aconitum napellus* L. (Hitchcock & Green, 1929; Lauener & Tamura, 1978).

多年生至一年生草本。根为多年生直根,或由2个或数个块根组成,或为一年生直根。茎直立或缠绕。叶为单叶,互生,有时均基生,叶片圆形、肾形或五角形,掌状分裂,少有不分裂,基部心形,平截或楔形。花序通常总状、圆锥状或伞房状,有时单生;花梗有2小苞片。花两性,两侧对称。萼片5,花瓣状,紫色、蓝色或黄色,上萼片1,镰刀形、船形、盔形或圆筒形,通常有喙,侧萼片2,近圆形,下萼片2,较小,近长圆形。花瓣2枚,有爪,爪部弯曲或直立,瓣片通常有唇和距,通常在距的顶部、偶尔沿瓣片外缘生分泌组织。退化雄蕊通常不存在。雄蕊多数,花药椭圆球形,花丝有1纵脉,下部有翅。心皮3-5 (-6-13),花柱短,胚珠多数成二列生于子房室的腹缝线上。蓇葖有脉网,宿存花柱短,种子四面体形,只沿棱生翅或同时在表面生横膜翅。

全世界3亚属,约有300余种,广泛分布于北半球温带地区,主要分布于亚洲,其次是欧洲和北美洲。我国有3亚属,近150种,除海南岛外,在我国台湾和大陆各省区都有分布,但集中分布于云南西北部、四川西部和西藏东部,其次在东北地区也有不少种类。常见于海拔高于3000 m的林下、灌丛、林间草甸和高山草甸 (王文采, 1979)。

四川分布的乌头属植物多数集中在其西南部的横断山区和西部的川西高原地区,共有19种5变种为四川所特有。

由于目前缺乏世界性的修订工作,乌头属下还没有一个完善的系统,而我们的工作也只是针对四川的乌头属植物,因此我们的系统排列仍暂依王文采(1979)建立的乌头属系统,只是在有较充分的证据的情况下,对个别种的系统位置做了调整。

四川乌头属的系统排列

Systematic arrangement of the genus *Aconitum* from Sichuan

亚属**1.** 牛扁亚属**subgen. 1. *Lycoctonum* (DC.) Peterm.**

1. 黄毛乌头*A. chrysotrichum* W. T. Wang
2. 短距乌头*A. brevicalcaratum* (Finet & Gagnep.) Diels
   - 2a. 短距乌头var. *brevicalcaratum*
   - 2b. 无距乌头var. *parviflorum* Chen & Liu
3. 粗花乌头*A. crassiflorum* Hand.-Mazz.
4. 邛崃山乌头*A. rilongense* Kadota
5. 花葶乌头*A. scaposum* Franch.
6. 高乌头*A. sinomontanum* Nakai
   - 6a. 高乌头var. *sinomontanum*
   - 6b. 毛果高乌头var. *pilocarpum* W. T. Wang

亚属**2.** 乌头亚属**subgen. 2. *Aconitum***

乌头组**sect. *Aconitum***

系1. 甘青乌头系 ser. 1. *Tangutica* W. T. Wang

7. 甘青乌头*A. tanguticum* (Maxim.) Stapf
8. 螺瓣乌头*A. spiripetalum* Hand.-Mazz.
系2. 圆叶乌头系ser. 2. *Rotundifolia* Steinb.
9. 美丽乌头*A. pulchellum* Hand.-Mazz.
系3. 保山乌头系ser. 3. *Bullatifolia* W. T. Wang
10. 保山乌头*A. nagarum* Stapf
10a. 保山乌头var. *nagarum*
10b. 小白撑var. *acaule* (Finet & Gagnep.) Q. E. Yang
系4. 褐紫乌头系ser. 4. *Brunnea* W. T. Wang
11. 褐紫乌头*A. brunneum* Hand.-Mazz.
12. 小花乌头*A. pseudobrunneum* W. T. Wang
系5. 显柱乌头系ser. 5. *Stylosa* W. T. Wang
13. 膝瓣乌头*A. geniculatum* Fletcher & Lauener
14. 大渡乌头*A. franchetii* Finet & Gagnep.
14a. 大渡乌头var. *franchetii*
14b. 展毛大渡乌头var. *villosulum* W. T. Wang
15. 康定乌头*A. tatsienense* Finet & Gagnep.
16. 侧花乌头*A. secundiflorum* W. T. Wang
17. 木里乌头*A. phyllostegium* Hand.-Mazz.
18. 拟显柱乌头*A. stylosoides* W. T. Wang
系6. 岩乌头系ser. 6. *Racemulosa* W. T. Wang
19. 岩乌头*A. racemulosum* Franch.
19a. 岩乌头var. *racemulosum*
19b. 巨苞岩乌头var. *grandibracteolatum* W. T. Wang
20. 菱叶乌头*A. rhombifolium* Chen
系7. 蔓乌头系ser. 7. *Volubilia* Steinb.
21. 瓜叶乌头*A. hemsleyanum* Pritz.
21a. 瓜叶乌头var. *hemsleyanum*
21b. 展毛瓜叶乌头var. *atropurpureum* (Hand.-Mazz.) W. T. Wang
22. 珠芽乌头*A. bulbilliferum* Hand.-Mazz.
23. 黄草乌*A. vilmorinianum* Kom.
23a. 黄草乌var. *vilmorinianum*
23b. 展毛黄草乌var. *patentipilum* W. T. Wang
24．紫乌头*A. delavayi* Franch.
25．西南乌头*A. episcopale* Lévl.
26．弯喙乌头*A. campylorrhynchum* Hand.-Mazz.
27．川鄂乌头*A. henryi* Pritz.
28．大麻叶乌头*A. cannabifolium* Franch. ex Finet & Gagnep.
系8. 乌头系ser. 8. *Inflata* Steinb.
29．乌头*A. carmichaeli* Debx.
系9. 兴安乌头系ser. 9. *Ambigua* Steinb.
30．缺刻乌头*A. incisofidum* W. T. Wang
31．冷杉林乌头*A. abietetorum* W. T. Wang & L. Q. Li
32．冕宁乌头*A. legendrei* Hand.-Mazz.
32a. 冕宁乌头var. *legendrei*
32b. 低盔冕宁乌头var. *albovillosum* (Chen & Liu) Y. Luo & Q. E. Yang
33．工布乌头*A. kongboense* Lauener
33a. 工布乌头var. *kongboense*
33b. 展毛工布乌头var. *villosum* W. T. Wang
34．毛瓣乌头*A. pilopetalum* W. T. Wang & L. Q. Li

35．贡嘎乌头*A. liljestrandii* Hand.-Mazz.
35a. 贡嘎乌头var. *liljestrandii*
35b. 刷经寺乌头var. *fangianum* (W. T. Wang) Y. Luo & Q. E. Yang
36．东俄洛乌头*A. tongolense* Ulbr.
37．狭裂乌头*A. refractum* (Finet & Gagnep.) Hand.-Mazz.
系10. 短柄乌头系 ser. 10. *Brachypoda* W. T. Wang
38．短柄乌头*A. brachypodum* Diels
38a. 短柄乌头var. *brachypodum*
38b. 展毛短柄乌头var. *laxiflorum* Fletcher & Lauener
39．镰形乌头*A. falciforme* Hand.-Mazz.
40．会理乌头*A. huiliense* Hand.-Mazz.
41．凉山乌头*A. liangshanicum* W. T. Wang
42．无毛乌头*A. glabrisepalum* W. T. Wang
43．多裂乌头*A. polyschistum* Hand.-Mazz.
44．伏毛铁棒锤*A. flavum* Hand.-Mazz.
45．铁棒锤*A. pendulum* Busch
亚属3. 露蕊乌头亚属subgen. 3. *Gymnaconitum* (Stapf) Rapaics
46．露蕊乌头*A. gymnandrum* Maxim.

四川乌头属分亚属、系和分种检索表

1. 根为一年生直根;萼片有爪;花瓣的唇扇形,边缘有小齿;心皮6-8;叶掌状全裂,全裂片羽状细裂(亚属3. 露蕊乌头亚属 subgen. 3. **Gymnaconitum**) (川西)······················ 46. 露蕊乌头**A. gymnandrum**
1. 根为多年生直根或由2至数个块根组成;萼片无或近无爪;花瓣的唇非扇形。
  2. 根为多年生直根(亚属1. 牛扁亚属 subgen. 1. **Lycoctonum**)
    3. 花序轴和花梗被反曲和紧贴的短柔毛。
      4. 萼片暗黄色·· 4. 邛崃山乌头**A. rilongense**
      4. 萼片蓝紫色或淡紫色。
        5. 子房无毛(川西,川东)·· 6a. 高乌头**A. sinomontanum**
        5. 子房被短柔毛(川西北)····················6b. 毛果高乌头**A. sinomontanum** var. **pilocarpum**
    3. 花序轴和花梗被开展的毛。
      6. 花瓣的距通常比唇长;叶基部通常有明显的鞘(四川广布) ···········5. 花葶乌头**A. scaposum**
      6. 花瓣的距通常与唇近等长或较唇短;叶基部通常无鞘。
        7. 花较稀疏,花梗稍长,长5-35 mm;花瓣的距通常与唇近等长 (川西)···3. 粗花乌头**A. crassiflorum**
        7. 花较密集,花梗短,长1.5-5 mm;花瓣的距短或无。
          8. 植株较小,高30-60 cm,叶宽2.4-5.4 cm,上萼片高0.9-1 cm (雅江,稻城) ··· 1. 黄毛乌头**A. chrysotrichum**
          8. 植株高大,高60-120 cm,叶宽7.5-13 cm,上萼片高1.3-1.5 cm。
            9. 花瓣有4-5 mm的短距(川西南) ·······················2a. 短距乌头**A. brevicalcaratum**
            9. 花瓣无距(木里) ····················2b. 无距乌头**A. brevicalcaratum** var. **parviflorum**
  2. 根由2至数个块根组成(亚属2. 乌头亚属 subgen. 2. **Aconitum**)。
    10. 基生叶发育,通常数个丛生,或聚集在茎基部附近,在开花时仍存在。
      11. 块根2,较大;叶较大,宽8.5-30 cm;植株高40-100 cm (系3. 保山乌头系 ser. 3. **Bullatifolia**)
        12. 花梗被贴伏卷曲毛(川西南) ···································· 10a. 保山乌头**A. nagarum**
        12. 花梗被开展的腺毛(盐源) ···························· 10b. 小白撑**A. nagarum** var. **acaule**
      11. 块根2,小;叶较小,宽在7 cm以下;植株高6-50 cm。
        13. 叶掌状深裂;花瓣瓣片小,无距,唇不明显(系1. 甘青乌头系 ser. 1. **Tangutica**)。

14. 花瓣的爪上部螺旋状弯曲(川西) ··························8. 螺瓣乌头**A. spiripetalum**
14. 花瓣的爪上部直(川西) ···································· 7. 甘青乌头**A. tanguticum**
13. 叶掌状全裂;花瓣的瓣片较大,有明显的唇和向后弯的距(系2. 圆叶乌头系 ser. 2. **Rotundifolia**) (川西)··9. 美丽乌头**A. pulchellum**
10. 基生叶不存在或在开花时枯萎。
15. 叶薄革质,掌状不分裂或三深裂,一回裂片通常不再分裂;上萼片高盔形或近圆筒形(系6. 岩乌头系 ser. 6. **Racemulosa**)。
16. 叶不分裂,菱状卵形或卵形(川西)································20. 菱叶乌头**A. rhombifolium**
16. 叶掌状三深裂,五角形或圆菱形(川西,川东南)。
17. 小苞片小,披针形或披针状线形 ····························19a. 岩乌头**A. racemulosum**
17. 小苞片较大,卵形、宽卵形或菱形 ··19b. 巨苞岩乌头**A. racemulosum** var. **grandibracteolatum**
15. 叶草质或纸质,掌状三深裂或三全裂,深裂片二回或三回分裂。
18. 茎缠绕,上萼片通常圆筒状高盔形或盔形(系7. 蔓乌头系 ser. 7. **Volubilia**)。
19. 叶分裂程度较小,掌状深裂,分裂至距基部0.6-3.2 cm。
20. 叶大,6.5-12×8-13 cm,通常无珠芽。
21. 花梗无毛或被卷曲毛(四川广布) ···············21a. 瓜叶乌头 **A. hemsleyanum**
21. 花梗被开展毛(川西) ··· 21b. 展毛瓜叶乌头**A. hemsleyanum** var. **atropurpureum**
20. 叶相对较小,5.5-9×6-9 cm,通常叶腋上都有2-4个珠芽(会理,米易) ···22. 珠芽乌头**A. bulbilliferum**
19. 叶分裂程度较大,近全裂或三全裂。
22. 叶三全裂,全裂片基部变狭成柄状。
23. 花梗被卷曲毛(川东,川北) ································ 27. 川鄂乌头**A. henryi**
23. 花梗被开展毛(川东北)··························28. 大麻叶乌头**A. cannabifolium**
22. 叶近全裂或三全裂,裂片基部不变狭成叶柄状。
24. 中央全裂片宽菱形,裂片较宽。
25. 花梗被卷曲毛(川西南) ···················· 23a. **黄草乌** **A. vilmorinianum**
25. 花梗被开展毛(会东) ···23b. 展毛黄草乌**A. vilmorinianum** var. **patentipilum**
24. 中央全裂片卵状菱形或卵状狭菱形,裂片较细。
26. 花梗被开展毛(川西南) ·································24. 紫乌头 **A. delavayi**
26. 花梗被卷曲毛。
27. 上萼片喙长达6 mm,稍向上弧状弯曲(川西)··· 26. 弯喙乌头**A. campylorrhynchum**
27. 上萼片喙短,不到3 mm,不弯曲(川西) ······25. 西南乌头**A. episcopale**
18. 茎直立,有时上部披散或蔓生,但不缠绕。
28. 叶片深裂,少数裂至近基部。
29. 上萼片船形或盔形,花瓣无距(系4. 褐紫乌头系 ser. 4. **Brunnea**)。
30. 上萼片船形,在中部不缢缩,具短喙(川西北)······ 11. 褐紫乌头 **A. brunneum**
30. 上萼片盔形,在中部缢缩,形成长喙(稻城)···12. 小花乌头**A. pseudobrunneum**
29. 上萼片高盔形或盔形,花瓣有距(系5. 显柱乌头系 ser. 5. **Stylosa**)。
31. 花梗无毛(川西南) ································· 13. 膝瓣乌头**A. geniculatum**
31. 花梗被毛。
32. 花梗被卷曲毛(川西,川西南)····················· 14a. 大渡乌头**A. franchetii**
32. 花梗被开展毛。
33. 叶分裂程度较小,三深裂至距基部5-12 mm处。
34. 上萼片船形,下缘直(稻城)········· 18. 拟显柱乌头 **A. stylosoides**
34. 上萼片盔形,下缘稍凹。
35. 植株高大,高约100 cm;叶较大,宽约8.5 cm;花瓣无毛(小金,汶川) ···········14b. 展毛大渡乌头**A. franchetii** var. **villosulum**

35. 植株矮小,高32-42 cm;叶较小,宽4.5-6.5 cm;花瓣有毛(茂县) ……………………………16. 侧花乌头**A. secundiflorum**

33. 叶分裂程度较大,三深裂至距基部3-6 mm处。

36. 植株高大,高60-120 cm;花瓣有毛(康定,道孚) …………………………………………………………… 15. 康定乌头**A. tatsienense**

36. 植株矮小,高约30 cm;花瓣无毛(木里)……………………………………………………………………… 17. 木里乌头**A. phyllostegium**

28. 叶片全裂或近全裂,上萼片高盔形、盔形或船形。

37. 上萼片高盔形;花瓣的瓣片前面常膨大(系8. 乌头系 ser. 8. **Inflata**)(四川全省,通常为栽培)……………………………………………………29. 乌头**A. carmichaeli**

37. 上萼片盔形或船形,少数高盔形;花瓣的瓣片不膨大。

38. 茎上叶疏生,有较长柄,一回裂片浅裂(系9. 兴安乌头系 ser. 9. **Ambigua**)。

39. 上萼片盔形或低盔形。

40. 上萼片窄,高盔形,高1.5-2 cm,下缘长1-1.2 cm。

41. 花序轴和花梗被卷曲毛(川西) … 33a. 工布乌头**A. kongboense**

41. 花序轴和花梗被开展毛。

42. 叶草质,中央裂片宽,菱形或宽菱形(川西南) ……………………………………………………32a. 冕宁乌头**A. legendrei**

42. 叶纸质,中央裂片窄,狭菱形 (稻城)…………………………………………… 33b. 展毛工布乌头**A. kongboense** var. **villosum**

40. 上萼片宽,盔形,高1.6-1.8 cm,下缘长1.5-1.6 cm。

43. 花序轴和花梗被卷曲毛(木里) …… 30. 缺刻乌头**A. incisofidum**

43. 花序轴和花梗被开展毛(木里)… 31. 冷杉林乌头**A. abietetorum**

39. 上萼片船形。

44. 上萼片较高,盔状船形,高0.9-1.2 cm。

45. 叶草质,中央裂片宽,菱形或宽菱形(木里、盐源)…………………………………… 32b. 低盔冕宁乌头**A. legendrei** var. **albovillosum**

45. 叶纸质,中央裂片窄,狭菱形(雅江)… 34. 毛瓣乌头**A. pilopetalum**

44. 上萼片较低,船形或镰形,高0.5-0.7 cm。

46. 花序轴密被卷曲毛。

47. 上萼片船形,子房无毛(康定)… 36. 东俄洛乌头**A. tongolense**

47. 上萼片镰形,子房被毛(雅江以西)……………………………………………………………………37. 狭裂乌头**A. refractum**

46. 花序轴和花梗密被开展毛。

48. 花相对较大,上萼片船形,下缘近直(川西)……………………………………………………………35a. 贡嘎乌头**A. liljestrandii**

48. 花相对较小,上萼片镰形,下缘凹(理县,红原鹧鸪山一带) …………………… 35b. 刷经寺乌头**A. liljestrandii** var. **fangianum**

38. 茎上部叶密集,有短柄或近无柄,一回裂片细裂(系10. 短柄乌头系 ser. 10. **Brachypoda**)。

49. 茎下部叶疏生,具稍长柄,上部叶密集,具短柄。

50. 花序轴和花梗被卷曲毛。

51. 花瓣有距(川西)……………………… 39. 镰形乌头**A. falciforme**

51. 花瓣无距或具短距(川西南)…… 41. 凉山乌头**A. liangshanicum**

50. 花序轴和花梗被开展毛(会理和米易的龙舟山一带) ……………………………………………………………………40. 会理乌头**A. huiliense**

49. 茎上所有叶都密集,具短柄或近无柄。

52. 上萼片盔状船形。

53. 花序轴和花梗无毛(川西,川西南) …42. 无毛乌头**A. glabrisepalum**

53. 花序轴和花梗被毛。

54. 花梗被卷曲毛。
55. 叶的分裂程度较大,末回裂片极狭条形(理县,马尔康,金川) ························ 43. 多裂乌头**A. polyschistum**
55. 叶分裂程度相对较小,末回裂片条形(川西南)·································· 38a. 短柄乌头**A. brachypodum**
54. 花梗被开展毛(木里,昭觉)·· 38b. 展毛短柄乌头**A. brachypodum** var. **laxiflorum**
52. 上萼片船形或镰形。
56. 花梗被卷曲毛(川西北)·····················44. 伏毛铁棒锤**A. flavum**
56. 花梗被开展毛(川西,川西南,川西北)······45. 铁棒锤**A. pendulum**

Key to subgenera, series and species of *Aconitum* from Sichuan

1. Herbs annual, with taproots; sepals clawed; petaline lip flabellate, margins denticulate; carpels 6-8; leaves palmatipartite, segments pinnately partite (subgen. 3. **Gymnaconitum**) (W Sichuan) ··· 46. **A. gymnandrum**
1. Herbs perennial, with rhizomes or 2-several tubers; sepals clawless or nearly so; petaline lip not flabellate.
2. Herbs perennial, with rhizomes (subgen. 1. **Lycoctonum**).
3. Inflorescence rachis and pedicels retrorse and appressed pubescent.
4. Sepals dull yellow···4. **A. rilongense**
4. Sepals blue-purple or purplish.
5. Ovary glabrous (W, E Sichuan) ··6a. **A. sinomontanum**
5. Ovary pubescent (NW Sichuan) ······························6b. **A. sinomontanum** var. **pilocarpum**
3. Inflorescence rachis and pedicels spreading pubescent.
6. Petaline spur usually longer than lip; leaves usually sheathed at base (common in Sichuan) ·· 5. **A. scaposum**
6. Petaline spur usually subequaling or shorter than lip; leaves usually not sheathed at base.
7. Flowers lax; pedicels longer, 5-35 mm long; petaline spur usually subequaling lip (W Sichuan) ··· 3. **A. crassiflorum**
7. Flowers dense; pedicels short, 1.5-5 mm long; petaline spur short or wanting.
8. Plants short, 30-60 cm tall; leaves 2.4-5.4 cm wide, upper sepals 0.9-1 cm tall (Yajiang, Daocheng) ··· 1. **A. chrysotrichum**
8. Plants fairly high, 60-120 cm tall; leaves 7.5-13 cm wide, upper sepals 1.3-1.5 cm tall.
9. Petaline spur 4-5 mm long (SW Sichuan) ······························2a. **A. brevicalcaratum**
9. Petals not spurred (Muli) ························· 2b. **A. brevicalcaratum** var. **parviflorum**
2. Herbs perennial, with 2-several tubers (Subgen. 2. **Aconitum**).
10. Stem scapose or subscapose; basal leaves persistent at anthesis.
11. Tubers 2, larger; leaves larger, 8.5-30 cm wide; plants 40-100 cm tall (ser. 3. **Bullatifolia**).
12. Pedicels retrorse and appressed pubescent (SW Sichuan) ···················· 10a. **A. nagarum**
12. Pedicels spreading glandular pubescent (Yanyuan) ··············10b. **A. nagarum** var. **acaule**
11. Tubers 2, small; leaves smaller, less than 7 cm wide; plants 6-50 cm tall.
13. Leaves palmatipartite; petaline limb small, not spurred, lip indistinct (ser. 1. **Tangutica**).
14. Petaline claw spirally curved at apex (W Sichuan)························ 8. **A. spiripetalum**
14. Petaline claw not distinctly curved at apex ································ 7. **A. tanguticum**
13. Leaves palmatisect; petaline limb larger, with spur curved backwards, lip distinct (ser. 2. **Rotundifolia**) (W Sichuan) ·· 9. **A. pulchellum**
10. Basal leaves wanting or withered at anthesis.
15. Leaves thinly coriaceous, undivided or palmately 3-partite, partitions usually not subdivided; upper sepal highly galeate or subcylindrical (ser. 6. **Racemulosa**).
16. Leaves undivided, rhombic-ovate or ovate (W Sichuan)·················· 20. **A. rhombifolium**
16. Leaves palmately 3-partite, pentagonal or orbicular-rhombic (W, SE Sichuan).

17. Bracteoles small, lanceolate or lanceolate-linear ···················19a. **A. racemulosum**
17. Bracteoles very large, ovate, broadly ovate or rhombic······································ ··· 19b. **A. racemulosum** var. **grandibracteolatum**

15. Leaves herbaceous or chartaceous, palmately 3-partite or 3-sect; partitions twice or thrice subdivided.
18. Stem twinning; upper sepal usually cylindrical-galeate or galeate (ser. 7. **Volubilia**).
19. Leaves palmatipartite to 0.6 – 3.2 cm from base.
20. Leaves larger, 6.5-12×8-13 cm, usually without bulbils in leaf axils.
21. Pedicels glabrous or sparsely retrorse and appressed pubescent (common in Sichuan) ··· 21a. **A. hemsleyanum**
21. Pedicels spreading pubescent (W Sichuan) ·· ···21b. **A. hemsleyanum** var. **atropurpureum**
20. Leaves smaller, 5.5-9×6-9 cm, usually with 2-4 bulbils in leaf axils (Huili, Miyi)·· ···22. **A. bulbilliferum**
19. Leaves subdissected or nearly 3-sect.
22. Leaves 3-sect; segments attenuate at base to become petiole-like.
23. Pedicels retrorse and appressed pubescent (E, N Sichuan) ···········27. **A. henryi**
23. Pedicels spreading pubescent (NE Sichuan)·················· 28. **A. cannabifolium**
22. Leaves subdissected or 3-sect; segments not attenuate at base to become petiole-like.
24. Middle segments of leaves wider, widely rhombic.
25. Pedicels retrorse and appressed pubescent (SW Sichuan) ······················· ·· 23a. **A. vilmorinianum**
25. Pedicels spreading pubescent (Huidong) ··· ······································23b. **A. vilmorinianum** var. **patentipilum**
24. Middle segments of leaves narrower, ovate-rhombic or narrowly ovate-rhombic.
26. Pedicels spreading pubescent (SW Sichuan)····················· 24. **A. delavayi**
26. Pedicels retrorse and appressed pubescent.
27. Upper sepal with beak to 6 mm long and slightly arching upwards (W Sichuan) ······································· 26. **A. campylorrhynchum**
27. Upper sepal with beak less than 3 mm long and not arching upwards······ ··· 25. **A. episcopale**

18. Stem erect, sometimes spreading or climbing, but not twinning.
28. Leaves deeply divided, rarely to base.
29. Upper sepal navicular or galeate; petals not spurred (ser. 4. **Brunnea**).
30. Upper sepal navicular, not constricted in the middle, shortly beaked (NW Sichuan)··· 11. **A. brunneum**
30. Upper sepal galeate, constricted in the middle, long beaked (Daocheng)··········· ··12. **A. pseudobrunneum**
29. Upper sepal highly galeate or galeate; petals spurred (ser. 5. **Stylosa**).
31. Pedicels glabrous (SW Sichuan)······························ 13. **A. geniculatum**
31. Pedicels pubescent.
32. Pedicels retrorse and appressed pubescent (W, SW Sichuan) ·················· ···14a. **A. franchetii**
32. Pedicels spreading pubescent.
33. Leaves 3-partite to 5-12 mm from base.
34. Upper sepal navicular, lower margin straight (Daocheng) ·············· ··18. **A. stylosoides**
34. Upper sepal galeate, lower margin slightly concave.
35. Plants tall, ca. 100 cm tall; leaves larger, ca. 8.5 cm wide; petals glabrous (Xiaojin, Wenchuan) ···14b. **A. franchetii** var. **villosulum**
35. Plants dwarf, 32-42 cm tall; leaves smaller, 4.5-6.5 cm wide; petals puberulous (Mao Xian) ·············· 16. **A. secundiflorum**
33. Leaves 3-partite to 3-6 mm from base.

36. Plants 60-120 cm tall; petals puberulous (Kangding, Dawu) ························15. **A. tatsienense**

36. Plants ca. 30 cm tall; petals glabrous (Muli) ··· 17. **A. phyllostegium**

28. Leaves dissected or subdissected; upper sepal highly galeate, galeate or navicular.

37. Upper sepal highly galeate; petaline limb usually dilated (ser. 8. **Inflata**) (commonly cultivated in Sichuan) ·····································29. **A. carmichaeli**

37. Upper sepal galeate or navicular, sometimes highly galeate; petaline limb not dilated.

38. Middle and distal cauline leaves sparsely arranged, long petiolate; primary lobes shallowly divided (ser. 9. **Ambigua**).

39. Upper sepal galeate or lowly galeate.

40. Upper sepal narrow, highly galeate, 1.5-2 cm tall, lower margin 1-1.2 cm long.

41. Inflorescence rachis and pedicels retrorse and appressed pubescent (W Sichuan)·····································33a. **A. kongboense**

41. Inflorescence rachis and pedicels spreading pubescent.

42. Leaves herbaceous; central lobe wide, rhombic or widely rhombic (SW Sichuan) ································ 32a. **A. legendrei**

42. Leaves chartaceous; central lobe narrow, narrowly rhombic (Daocheng) ··················33b. **A. kongboense** var. **villosum**

40. Upper sepal wide, galeate, 1.6-1.8 cm high, lower margin 1.5-1.6 cm long.

43. Inflorescence rachis and pedicels retrorse and appressed pubescent (Muli) ·····································30. **A. incisofidum**

43. Inflorescence rachis and pedicels spreading pubescent (Muli) ·· 31. **A. abietetorum**

39. Upper sepal navicular.

44. Upper sepal higher, galeate-navicular, 0.9-1.2 cm high.

45. Leaves herbaceous; central lobe wide, rhombic or widely rhombic ··································· 32b. **A. legendrei** var. **albovillosum**

45. Leaves chartaceous; central lobe narrow, narrowly rhombic (Yajiang) ··· 34. **A. pilopetalum**

44. Upper sepal lower, navicular or falcate, 0.5-0.7 cm high.

46. Inflorescence rachis densely retrorse and appressed pubescent.

47. Upper sepal navicular; ovary glabrous (Kangding) ·· 36. **A. tongolense**

47. Upper sepal falcate; ovary pubescent (W to Yajiang) ··· 37. **A. refractum**

46. Inflorescence rachis and pedicels spreading pubescent.

48. Flowers relatively large; upper sepal navicular, lower margin nearly straight (W Sichuan) ···················35a. **A. liljestrandii**

48. Flowers relatively small; upper sepal falcate, lower margin concave (Li Xian, Hongyuan) ·········35b. **A. liljestrandii** var. **fangianum**

38. Distal cauline leaves aggregate, shortly petiolate or sessile; primary lobes finely subdivided (ser. 10. **Brachypoda**).

49. Proximal cauline leaves sparsely arranged, with longer petioles, distal ones aggregate, shortly petiolate.

50. Inflorescence rachis and pedicels retrorse and appressed pubescent.

51. Petals spurred (W Sichuan) ························ 39. **A. falciforme**

51. Petals not spurred or shortly spurred (SW Sichuan) ···41. **A. liangshanicum**

50. Inflorescence rachis and pedicels spreading pubescent (Huili, Miyi) ···40. **A. huiliense**

49. Cauline leaves all aggregate, shortly petiolate or sessile.

52. Upper sepal galeate-navicular.

53. Inflorescence rachis and pedicels glabrous (W, SW Sichuan) ………………………………………………………………42. **A. glabrisepalum**
53. Inflorescence rachis and pedicels pubescent.
54. Pedicels retrorse and appressed pubescent.
55. Leaves strongly divided; ultimate lobes most narrrowly linear (Li Xian, Barkam, Jinchuan) ……………43. **A. polyschistum**
55. Leaves less strongly divided; ultimate lobes linear (SW Sichuan)………………………………38a. **A. brachypodum**
54. Pedicels spreading pubescent (Muli, Zhaojue)…………………………………………………… 38b. **A. brachypodum** var. **laxiflorum**
52. Upper sepal navicular or falcate.
56. Pedicels retrorse and appressed pubescent (NW Sichuan)………………………………………………………………………………44. **A. flavum**
56. Pedicels spreading pubescent (W, SW, NW Sichuan) ………………………………………………………………………………45. **A. pendulum**

亚属**1.** 牛扁亚属

Subgen. 1. **Lycoctonum** (DC.) Peterm. in Deutschl. Fl. 16. 1846; Tamura & Lauener in Not. Bot. Gard. Edinb. 37: 431. 1979; Tamura in Hiepko, Natür. Pflanzenf., zweite Aufl., 17a (4): 278. 1995.

Subgen. *Paraconitum* Rapaics in Növ.Közl. 6: 139. 1907; Hand.-Mazz. in Acta Hort. Gotob. 13: 77. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 156. 1979.

多年生直根。萼片无爪;上萼片圆筒形、高盔形或稀船形。花瓣的瓣片顶端有分泌组织,无或有向后弯曲的距;唇线形或不明显。心皮3(-6-8)。

约40余种(Tamura, 1995), 主要分布在欧亚大陆,在北美东部也有分布。我国约有18种。

目前四川地区共有牛扁亚属植物6种2变种,即黄毛乌头、短距乌头、无距乌头、邛崃山乌头、粗花乌头、花葶乌头、高乌头和毛果高乌头。除黄毛乌头和邛崃山乌头为狭域分布外,其他种分布相对较广,变异也较大,在分类上长期以来存在很多混乱。经过杨亲二(1999)的工作,已经基本澄清了这几种植物的分类问题。

1. 黄毛乌头

Aconitum chrysotrichum W. T. Wang in Fl. Reip. Pop. Sin. 27: 604. 1979; et in l.c. 27: 156, pl. 24, figs. 1-4; L. Q. Li & Kadota in Fl. China 6: 160. 2001. Type: China. Sichuan (四川): Daocheng (稻城), in scrub on mountain, alt. 4300 m, 1973-08-12, Sichuan Veg. Exped. (四川植被队) 3732 (holotype, PE!; isotypes, CDBI!, KUN!).

多年生草本,高30-60 cm。根长约5 cm。茎直立不分枝,被黄色糙毛。基生叶数个,有长柄;叶片近圆形或圆肾形,长1.2-3.2 cm,宽2.4-5.4 cm,基部深心形,三深裂,深裂片多少邻接,中央深裂片楔状倒梯形,三浅裂,边缘具粗齿,侧深裂片不等二浅裂,两面有糙伏毛;叶柄长3-7.5 cm,有近开展的黄糙毛。茎生叶2-4,下部的似基生叶,最上部的有短柄。花序长10-30 cm,有10-20朵花;轴和花梗密被开展的黄糙毛;下部苞片叶状条形,其他的线形;花梗长2-5 mm;小苞片生花梗中部,狭线形,长2-5 mm,宽达0.4 mm;萼片淡蓝紫色或紫红色,外面有开展的黄色毛,上萼片圆筒状高盔形,高9-10 mm,粗约3.5 mm,外缘在中部以下少缢

缩,然后近平展与下缘形成长喙,下缘长8-9 mm,侧萼片长约7.5 mm,下萼片长约7 mm;花瓣长约8 mm,无毛,无距,瓣片长约5 mm,唇长3.5 mm;雄蕊无毛,花丝全缘;心皮3,子房有黄色柔毛。花期8-9月。果期10月。

分布:四川雅江、稻城。

Sichuan (四川): Daocheng (稻城), Sichuan Veg. Exped. (四川植被队) 3732, 3835 (PE, CDBI, KUN), Sichuan Veg. Exped. (四川植被队) 3650, 3845 (CDBI), Qinghai-Xizang Exped. (青藏队) 5102, 5146 (CDBI), Z. G. Liu (刘照光) 29050 (CDBI), Y. Luo & Y. B. Luo (罗艳,罗毅波) 408; Yajiang (雅江), Y. Luo & Y. B. Luo (罗艳,罗毅波) 358。

通过对川西的考察,我们发现本种在雅江、稻城一带比较常见。本种近粗花乌头和短距乌头,但植株较小,全株被开展的黄毛,叶和花都较小,花瓣无距,可以区别。它们分布的生境也有区别,本种一般生长在较开阔的高山顶上的灌丛里,海拔4000-4900 m,而粗花乌头和短距乌头一般生长在较潮湿且相对封闭的林下或林间草甸,海拔3300-4000 m。黄毛乌头仅在四川西部高原上发现有分布(图2),短矩乌头(图3)和粗花乌头(图4)的分布区基本重叠,在川西南和滇西北都有分布,这3个种在外部形态和体态上都很相似,且都为四倍体(杨亲二, 1990, 1999)。这3个种与花葶乌头也有较近的关系,而花葶乌头为二倍体,分布范围较广(图5), 从华中一直到西南都有分布,集中分布在海拔2000-3000 m的地区,因此它们四者在垂直分布上有较明显的替代关系。

2. 短距乌头

Aconitum brevicalcaratum (Finet & Gagnep.) Diels in Not. Bot. Gard. Edinb. 5: 267. 1912, p.p.; Hand.-Mazz., Symb. Sin. 7: 284. 1931, p.p.; et in Acta Hort. Gotob. 13: 81. 1939, p.p.; W. T. Wang in Acta Phytotax. Sin. Addit. 1: 59. 1965, p.p.; et in Fl. Reip. Pop. Sin. 27: 160. 1979, p.p.; Tamura & Lauener in Not. Bot. Gard. Edinb. 37: 444. 1979, p.p.; Q. E. Yang in Acta Bot. Yunnan. 16: 240. 1994; L. Q. Li & Kadota in Fl. China 6: 160. 2001. ——*A. lycoctonum* L. var. *brevicalcaratum* Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 502. 1904. Type: China. Yunnan (云南): Eryuan (洱源), Delavay 975 (lectotype, P!).

多年生草本,高60-100 cm。根粗壮,圆柱形。茎中部以下密被反曲而紧贴的短柔毛。基生叶3-4,茎下部叶具长柄;叶片肾形,长4.8-9.2 cm,宽7.5-13 cm,三深裂约至本身长度3/4处,深裂片互相稍分开或稍覆压,两面被稍密的紧贴短柔毛;叶柄长14-20(-28) cm,被反曲的短柔毛。总状花序长20-40 cm,具密集的花;轴和花梗密被伸展的淡黄色短柔毛;基部苞片似叶,近全裂,其他苞片渐变小,长圆形至线状长圆形;花序下部的花梗稍长, 可达1-2 cm,其他花梗渐变短,长1.5-5 mm;小苞片

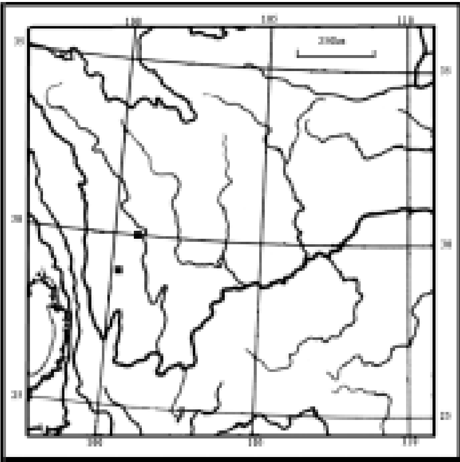


图2　黄毛乌头的分布
Fig. 2.　Distribution of *Aconitum chrysotrichum*.

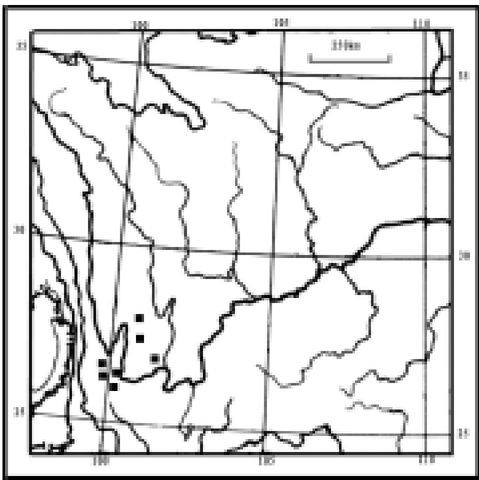


图3 短距乌头的分布
Fig. 3. Distribution of *Aconitum brevicalcaratum* var. *brevicalcaratum*.

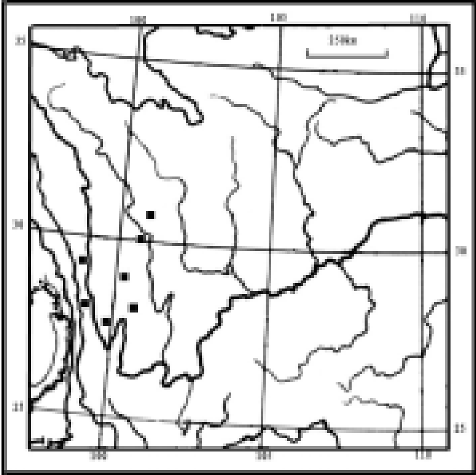


图4 粗花乌头的分布
Fig. 4. Distribution of *Aconitum crassiflorum*.

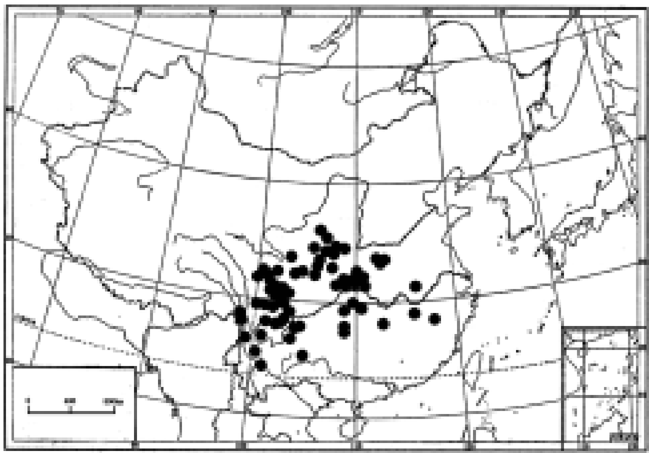


图5 花葶乌头的分布
Fig. 5. Distribution of *Aconitum scaposum*.

生花梗基部,线形,长4-6 mm;萼片紫红色或深紫色,外部被短柔毛,上萼片高1.3-1.5 cm,圆筒形,中部粗约4.5 mm,下缘直;花瓣无毛,瓣片短,顶端圆,具4-5 mm明显向后弯的短距,或无距;雄蕊无毛,花丝全缘;心皮3,子房被绢状短柔毛。蓇葖被短柔毛。种子倒圆锥三角形,有横狭翅。花期8-10月。

分布:四川西南部,云南西北部。

2a. 短距乌头 原变种

var. **brevicalcaratum**

A. lauenerianum Fletcher in Not. Bot. Gard. Edinb. 20: 187, pl. 266, figs. 15, 16. 1950.

——*A. brevicalcaratum* var. *lauenerianum* (Fletcher) W. T. Wang in Acta Phytotax. Sin. Addit. 1: 59. 1965; et in Fl. Reip. Pop. Sin. 27: 162. 1979; Tamura & Lauener in Not. Bot. Gard. Edinb. 37: 444. 1979. Type: China. Yunnan (云南): Lijiang (丽江), Forrest 6559 (holotype, E!).

A. lycoctonum var. *vulparium* auct. non (Reichb.) Regel: Franch., Pl. Delavay. 29. 1889.

本变种花瓣具4-5 mm明显向后弯的短距。

分布:四川西南部,云南西北部。

Sichuan (四川): Muli (木里), S. K. Wu (武素功) 2487 (KUN), F. T. Pu & G. Yao (溥发鼎,姚淦) 473 (NAS), Qinghai-Xizang Exped. (青藏队) 14291; Yanbian (盐边), Yanbian Division (盐边队) 6437 (MS); Yanyuan (盐源), Qinghai-Xizang Exped. (青藏队) 12401 (PE, KUN), Yanyuan Division (盐源队) 628 (PE, MS). **Yunnan** (云南): Dali (大理), Q. E. Yang (杨亲二) 8833, 8829, 8834 (KUN); Heqing (鹤庆), R. C. Ching (秦仁昌) 23505; Jianchuan (剑川), Y. Q. Mo (莫云强) 62-124 (KUN); Lijiang (丽江), C. W. Wang (王启无) 71576, C. C. Lü (吕春朝) 21 (KUN), Q. E. Yang (杨亲二) 8932 (KUN)。

2b. 无距乌头　变种　新拟

var. **parviflorum** Chen & Liu in Bull. Fan Mem. Inst. Biol., Bot. Ser. 11: 43. 1941; Q. E. Yang in Acta Bot. Yunnan. 16: 240. 1994; L. Q. Li & Kadota in Fl. China 6: 161. 2001. Type: China. Yunnan (云南): Lijiang (丽江), on grassy slope, alt. 2300 m, 1938-08-01, T. T. Yu (俞德浚) 15389 (holotype, KUN!; isotype, PE!).

A. lycoctonum var. *brevicalcaratum* Finet & Gagnep. f. *bracteatum* Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 502. 1904.——*A. brevicalcaratum* (Finet & Gagnep.) Diels f. *bracteatum* (Finet & Gagnep.) Hand.-Mazz. in Acta Hort. Gotob. 13: 81. 1939. Type: China. Yunnan (云南): Lijiang (丽江), 1884-09, Delavay 975 bis (holotype, P!).

A. brevicalcaratum auct. non (Finet & Gagnep.) Diels: Diels in Not. Bot. Gard. Edinb. 5: 267. 1912, p.p.; Hand.-Mazz., Symb. Sin. 7: 284. 1931, p.p.; et in Acta Hort. Gotob. 13: 81. 1939, p.p.; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 186, pl. 266, fig. 10. 1950; W. T. Wang in Acta Phytotax. Sin. Addit. 1: 59. 1965, p.p.; et in Fl. Reip. Pop. Sin. 27: 160, pl. 25, figs. 1-4. 1979, p.p.; Tamura & Lauener in Not. Bot. Gard. Edinb. 37: 444. 1979, p.p.

本变种与原变种的区别在于花瓣无距。原变种的花瓣有4-5 mm的明显向后弯的短距。

分布:四川西南部,云南西北部。

Sichuan (四川): Muli (木里), Qinghai-Xizang Exped. (青藏队) 13061, Y. Luo & Y. S. Chen (罗艳,陈又生) 522, 540. **Yunnan** (云南): Lijiang (丽江), T. T. Yu (俞德浚) 15389, R. C. Ching (秦仁昌) 30522, K. M. Feng (冯国楣) 22582, 21286 (KUN), Q. E. Yang (杨亲二) 8813, 8936 (KUN), Y. Luo & Y. S. Chen (罗艳,陈又生) 504。

3. 粗花乌头

Aconitum crassiflorum Hand.-Mazz., Symb. Sin. 7: 283, t. 6, fig. 7. 1931; et in Acta Hort. Gotob. 13: 82. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 200. 1950; W. T. Wang in Acta Phytotax. Sin. Addit. 1: 59. 1965; Lauener & Tamura in Not. Bot. Gard. Edinb.

37: 123. 1978; W. T. Wang in Fl. Reip. Pop. Sin. 27: 165, pl. 25, figs. 7, 8. 1979; Q. E. Yang in Acta Phytotax. Sin. 37: 549. 1999; Kadota in J. Jpn. Bot. 74: 286, fig. 3: B-D. 1999; L. Q. Li & Kadota in Fl. China 6: 162. 2001. Type: China. Yunnan (云南): Zhongdian (中甸), 1914-08-05, Handel-Mazzetti 4487 (holotype, W).

A. wardii Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 188, pl. 246, fig. 17. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 168. 1979; Tamura & Lauener in Not. Bot. Gard. Edinb. 37: 454. 1979, p.p., excl. syn. *A. leucostomum* Worosch.; L. Q. Li & Kadota in Fl. China 6: 164. 2001. Type: China. Sichuan (四川): Muli (木里), alt. 3200 m, 1917-08-21, Kingdon-Ward 4825 (holotype, E!; isotype, K!).

A. wardii var. *trisectum* W. T. Wang & L. Q. Li in Acta Phytotax. Sin. 25: 24, pl. 1, fig. 1. 1987; L. Q. Li & Kadota in Fl. China 6: 164. 2001. Type: China. Sichuan (四川): Yajiang (雅江), in *Abies* forest, alt. 3700-3950 m, 1983-08-06, K. Y. Lang et al. (郎楷永等) 2866 (holotype, PE!; isotype, KUN!).

A. kialaense W. T. Wang in Acta Bot. Yunnan. 15: 347, fig. 1: 3-5. 1993; L. Q. Li & Kadota in Fl. China 6: 161. 2001. Type: China. Sichuan (四川): Kangding (康定), 1892-08-17, Soulié 394 (holotype, P; photo, PE!).

A. brevicalcaratum auct. non (Finet & Gagnep.) Diels: W. T. Wang in Acta Phytotax. Sin. Addit. 1: 59. 1965, p.p., quoad Pl. Zhongdian. et Weixi.; et in Fl. Reip. Pop. Sin. 27: 160. 1979, p.p., quoad Pl. Zhongdian. et Weixi.; et in Guihaia 17: 11. 1997.

多年生草本,高48-70(-100) cm。茎中部以下疏被反曲的淡黄色短糙毛。基生叶2-3,具长柄;叶片圆肾形或肾形,长3.6-7 cm,宽7.6-12 cm,三深裂稍超过中部,深裂片近邻接,中央裂片楔状倒梯形,侧深裂片斜扇形,不等二或三裂,两面疏被短糙伏毛;叶柄长15-30 cm。总状花序长14-20(-36) cm,具排列稀疏的花;轴和花梗密被开展的短毛,基部苞片三深裂,长0.8-3 cm,其他苞片渐小,线形;下部花梗长1.2-3.5(-5.5) cm,其他花梗长5-12 mm;小苞片多生于花梗中部,线形;萼片蓝紫色,疏被短毛,上萼片圆筒形,高1.6-2.3 cm,中部粗4-7 mm;花瓣无毛,距通常比唇长,稍拳卷;雄蕊无毛,花丝全缘,心皮3,子房疏被短毛。花期8-9月。

分布:四川西部,云南西北部。

Sichuan (四川): Daocheng (稻城), Sichuan Veg. Exped. (四川植被队) 2583 (CDBI); Dawu (道孚), Sichuan Veg. Exped. (四川植被队) 5904 (PE, CDBI); Muli (木里), Kingdon-Ward 4825 (E), S. K. Wu (武素功) 2610 (KUN), L. H. Liu et al. (刘伦辉等) s.n., Qinghai-Xizang Exped. (青藏队) 13253, 14696, Q. S. Zhao et al. (赵清盛等) 8295, 4923, 8097 (CDBI), Sichuan Veg. Exped. (四川植被队) 473 (CDBI), Y. B. Yang & G. Yao (杨亚滨, 姚淦) 200 (CDBI), Q. E. Yang (杨亲二) 9318, Y. Luo & Y. S. Chen (罗艳,陈又生) 532; Yajiang (雅江), K. Y. Lang et al. (郎楷永等) 2934, 2866 (PE, KUN), Y. B. Luo (罗毅波) 95, Y. Luo & Y. B. Luo (罗艳,罗毅波) 356, 365, 367. **Yunnan** (云南): Dêqên (德钦), J. S. Yang (杨竞生) 8598, Q. E. Yang (杨亲二) 8919, 8921 (KUN); NW Yunnan (云南西北部), Forrest 28788; Weixi (维西), C. W. Wang (王启无) 68469, 64498, Q. E. Yang (杨亲二) 98443; Zhongdian (中甸), Forrest 290 (E), T. T. Yu (俞德浚) 12976, 12581, K. M. Feng (冯国楣)

1904, 2461 (KUN), 23278, 2010, Zhongdian Division (中甸队) 63-3367, 63-3385 (KUN), 965, 2027, Q. E. Yang (杨亲二) 8901, 8909, 8912 (KUN)。

4. 邛崃山乌头

Aconitum rilongense Kadota in J. Jpn. Bot. 74: 283, figs. 1-A, 2, 3A. 1999; L. Q. Li & Kadota in Fl. China 6: 160. 2001. Type: China. Sichuan (四川): Xiaojin (小金), Rilong, under *Abies* woods, alt. 3300 m, 1996-08-23, Y. Kadota 961004 (holotype, TNS; isotype, PE!).

多年生草本,高50-100 cm。根长10 cm。茎稀被贴伏毛。基生叶花期枯萎;下面的茎生叶具长柄,柄长15-30 cm;叶片肾形,长14-20 cm,宽14-23 cm,两面稀被短伏毛,(5-)7-9裂至距基部2-4 cm,中央裂片倒卵状菱形,侧裂片斜扇形,不等2或3浅裂。花序长14-16(-30) cm,有14-45朵花;轴和花梗密被贴伏毛;下面苞片3浅裂,其他条形,不裂。花梗长1-1.5 cm;小苞片生花梗基部,条形,长5-8 mm;萼片暗黄色,外面被贴伏柔毛,上萼片圆筒状高盔形,高1.3-2.2 cm,粗8-10 mm,具喙,下缘长0.9-1.2 cm,侧萼片长0.8-0.9 cm,下萼片长0.6-0.9 cm;花瓣无毛,唇长约4 mm,瓣片长约2 mm,距长约7 mm,稍向后弯曲;雄蕊无毛,花丝全缘;心皮3,无毛或被开展柔毛。花期8-9月,果期10月。

分布:四川小金。

Sichuan (四川): Xiaojin (小金), Kadota 961004, Y. Luo & Y. B. Luo (罗艳,罗毅波) 399。

本种以花暗黄色在四川牛扁亚属植物中显得较为特别。

5. 花葶乌头

Aconitum scaposum Franch. in Morot, Journ. Bot. 8: 277. 1894; Hand.-Mazz. in Acta Hort. Gotob. 13: 78. 1939; Icon. Corm. Sin. 1: 686, fig. 1372. 1972; Lauener & Tamura in Not. Bot. Gard. Edinb. 37: 119, fig. 1a. 1978; W. T. Wang in Fl. Reip. Pop. Sin. 27: 162, pl. 27, figs. 1-6. 1979; Q. E. Yang in Acta Phytotax. Sin. 37: 549. 1999. Type: China. Chongqing (重庆): Chengkou (城口), alt. 2400 m, Farges 116 (holotype, P!; isotype, K!).

A. vaginatum Pritz. in Bot. Jahrb. 29: 328. 1900; Hand.-Mazz. in Acta Hort. Gotob. 13: 77. 1939; Icon. Corm. Sin. 1: 686, fig. 1371. 1972. ——*A. scaposum* var. *vaginatum* (Pritz.) Rapaics in Növ.Közl. 6: 168. 1907; W. T. Wang in Fl. Reip. Pop. Sin. 27: 164, pl. 27, figs. 10-12. 1979; L. Q. Li & Kadota in Fl. China 6: 162. 2001. Type: China. Sichuan (四川): Nanchuan (南川), Bock & von Rosthorn 905 (lectotype, designated by Lauener & Tamura in l.c., O).

A. cavaleriei Lévl. & Vant. in Bull. Soc. Agr. Sarthe 60: 78. 1905; Hand.-Mazz. in Acta Hort. Gotob. 13: 79. 1939; Lauener & Tamura in Not. Bot. Gard. Edinb. 37: 121. 1978; W. T. Wang in Fl. Reip. Pop. Sin. 27: 165, pl. 27, figs. 1-6. 1979; L. Q. Li & Kadota in Fl. China 6: 162. 2001. Type: China. Guizhou (贵州): Guiding (贵定), Pingfa (平伐), 1903-05, Cavalerie 708 (holotype, E!; isotype, K!).

A. scaposum var. *hupehanum* Rapaics in Növ.Közl. 6: 168. 1907; W. T. Wang in Fl. Reip. Pop. Sin. 27: 164, pl. 27, figs. 7-9. 1979; L. Q. Li & Kadota in Fl. China 6: 162. 2001. Type: China. Hubei (湖北): Without precise locality, Wilson 1636 A (syntype); Sichuan (四川):

Without precise locality, Farges 7 (syntype, P).

A. jucundum Diels in Not. Bot. Gard. Edinb. 5: 266. 1912; Hand.-Mazz. in Acta Hort. Gotob. 13: 78. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 192, pl. 266, fig. 8. 1950; Lauener & Green in Not. Bot. Gard. Edinb. 23: 576. 1961. Type: China. Yunnan (云南): Dali (大理), in open mountain meadow, alt. 3000 m, 1906-08, Forrest 4369 (holotype, E!).

A. chloranthum Hand.-Mazz. in Sitzgsanz. Akad. Wiss. Wien Math.-Nat. Kl. 60: 134. 1923. ——*A. jucundum* var. *chloranthum* (Hand.-Mazz.) Hand.-Mazz., Symb. Sin. 7: 282. 1931; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 193. 1950. ——*A. scaposum* var. *chloranthum* (Hand.-Mazz.) Lauener & Tamura in Not. Bot. Gard. Edinb. 37: 121. 1978. Type: China. Yunnan (云南): Mekong and Yangtze (Jinshajiang River) divide, NW Yunnan, alt. 3125 m, 1915-08-30, Handel-Mazzetti 7909 (holotype, WU; isotype, E!).

A. vaginatum var. *xanthanthum* Hand.-Mazz. in Acta Hort. Gotob. 13: 77. 1939. Type: China. Sichuan (四川): Wenchuan (汶川), Wilson 1033 (holotype Wu; isotype, K!).

A. aggregatifolium Chang ex W. T. Wang in Acta Phytotax. Sin. Addit. 1: 60. 1965; Lauener & Tamura in Not. Bot. Gard. Edinb. 37: 123. 1978. ——*A. cavaleriei* var. *aggregatifolium* (Chang ex W. T. Wang) W. T. Wang in Fl. Reip. Pop. Sin. 27: 165. 1979. Type: China. Sichuan (四川): Qingchuan (青川), in grassland, alt. 2200 m, 1930-09-01, F. T. Wang (汪发瓒) 22468 (holotype, PE!; isotype, N!).

A. scaposum var. *patentipilum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 60. 1965; Lauener & Tamura in Not. Bot. Gard. Edinb. 37: 123. 1978. Type: China. Shaanxi (陕西): Yang Xian (洋县), alt. 1500 m, 1933-09-07, H. W. Kung (孔宪武) 3563 (holotype, PE!).

多年生草本,高35-67 cm。茎密被反曲的淡黄色短毛。基生叶3-4,具长柄;叶片肾状五角形,长5.5-11 cm,宽8.5-22 cm,基部心形,三裂稍超过中部,中裂片倒梯状菱形,急尖,稀渐尖,边缘有粗齿,侧裂片斜扇形,不等二浅裂,两面有短伏毛;叶柄长13-40 cm,基部有鞘。茎生叶2-4,有时不存在,有时等距排列或集中在茎基部处。叶柄鞘状。总状花序长(20-)25-40 cm,具排列稀疏的花;苞片披针形或长圆形;花梗长1.4-3.4 cm,被开展的淡黄色长毛;小苞片通常生于花梗基部;萼片蓝紫色或乳黄色,外面疏被短糙毛,上萼片圆筒形,高1.3-1.8 cm,下缘斜展形成短喙;花瓣距比瓣片长,拳卷;雄蕊无毛,花丝全缘;心皮3,子房被黄色绢毛。蓇葖不等大;种子倒卵形,密生横狭翅。花期8-9月。

分布:四川,重庆,云南,贵州,湖北,湖南,江西,安徽,河南,陕西,甘肃,宁夏。

Anhui (安徽): Jinzhai (金寨), X. S. Shen (沈显生) 1639 (KUN). **Chongqing** (重庆): Chengkou (城口), T. L. Dai (戴天伦) 106542; Fengjie (奉节), H. F. Zhou & H. Y. Su (周洪富, 粟和毅) 108515, Z. R. Zhang (张泽荣) 25452; Wushan (巫山), G. H. Yang (杨光辉) 59079; Wuxi (巫溪), K. L. Chu (曲桂龄) 2035, G. H. Yang (杨光辉) 59266, 65300, 65400. **Gansu** (甘肃): Kang Xian (康县), Z. Y. Zhang (张志英) 17313; Pingliang (平凉), Yellow River Exped. (黄河队) 2066, T. P. Wang (王作宾) 13346; Tianshui (天水), K. M. Liou (刘继孟) 10415; Wen Xian (文县), Q. E. Yang (杨亲二) 9215. **Guizhou** (贵州): Anlong (安龙), C. D. Li (李朝斗) 351; Guiding (贵定), Cavalerie s.n., 708, 2553 (E); Shiqian (石阡), Wulingshan

Exped. (武陵山考察队) 2828 (KUN); Yinjiang (印江), C. P. Tsien (简焯坡) 30748. **Henan** (河南): Lushi (卢氏), K. M. Liou (刘继孟) 5085; Shangcheng (商城), Pl. Resour. Exped. (植物资源考察队) D144377; Song Xian (嵩县), K. C. Kuan & T. L. Dai (关克俭,戴天伦) 2353; Xixia (西峡), Anonymous 668. **Hubei** (湖北): Badong (巴东), Hubei Bot. Exped. (鄂植考队) 24409; Fang Xian (房县), Henry 6867; Hefeng (鹤峰), H. J. Li (李洪钧) 6906 (KUN); Jun Xian (均县), K. R. Liu (刘克荣) 183; Shennongjia (神农架), Hubei Bot. Exped. (鄂植考队) 22743, 25106, 25184, Sino-Amer. W. Hubei Exped. (中美联合鄂西植物考察队) 15, 136 (KUN); Xingshan (兴山), H. J. Li (李洪钧) 670; Zigui (秭归), T. P. Wang (王作宾) 12089. **Hunan** (湖南): Cili (慈利), W Hunan Exped. (湘西考察队) 413, 426; Mt. Hengshan (衡山), J. S. Yue et al. (岳俊三等) 1589 (NAS). **Jiangxi** (江西): Jing'an (靖安), Y. G. Xiong (熊耀国) 1378; Qianshan (铅山), Anonymous 4502. **Ningxia** (宁夏): Guyuan (固原), T. P. Wang (王作宾) 17228. **Shaanxi** (陕西): Feng Xian (凤县), K. M. Liou (刘继孟) 10660; Hu Xian (户县), P. C. Kuo (郭本兆) 617, 814; Lueyang (略阳), K. T. Fu (傅坤俊) 5894, 6095; Mt. Taibaishan (太白山), W. Y. Hsia (夏纬英) 31, P. C. Tsoong (钟补求) 301; Shanyang (山阳), T. P. Wang (王作宾) 16377, 16405; Yang Xian (洋县): H. W. Kung (孔宪武) 3563. **Sichuan** (四川): Baoxing (宝兴), K. L. Chu (曲桂龄) 3613; Barkam (马尔康), Southwest Academy of Forestry (西南林研室) 202; Butuo (布拖), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 5859; Danba (丹巴), The 8th Forest Management Brigade (第八森林经理大队) 2727; Ganluo (甘洛), Sichuan Veg. Exped. (四川植被队) 14343 (PE, CDBI); Hanyuan (汉源), T. P. Wang (王作宾) 9477; Hongxi (洪溪), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 1460; Hongya (洪雅), Wilson 1996 (K); Kangding (康定), K. C. Kuan & W. T. Wang (关克俭,王文采) 417, Cunningham 233, 499 (E); Leibo (雷波), Z. T. Guan (管中天) 8363, Sichuan Econ. Pl. Exped. (四川经济植物调查队) 569; Li Xian (理县), C. L. Wu (吴中伦) 33447, H. Li & C. H. Chow (李馨,周继西) 74149, Y. Luo & Y. B. Luo (罗艳,罗毅波) 327; Mabian (马边), T. H. Tu (杜大华) 5504; Mao Xian (茂县), Sichuan Veg. Exped. (四川植被队) 11044 (PE, CDBI), Y. Luo & Y. B. Luo (罗艳,罗毅波) 302; Meigu (美姑), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 1761; Mianning (冕宁), S. K. Wu (武素功) 2011; Mt. Emeishan (峨眉山), F. T. Wang (汪发缵) 23488, G. H. Yang (杨光辉) 57493, Wilson 4703 (K); Muli (木里), Kingdon-Ward 4578 (E); Nanchuan (南川), Sichuan Division (四川队) 2187; Nanping (南坪), Q. X. Li & X. C. Zhao (李全喜,赵兴存) 3117, P. C. Li (李沛琼) 218; Pingshan (屏山), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 1183, 1063; Pingwu (平武), H. L. Tsiang (蒋兴麟) 10799; Puge (普格), Y. Luo & Y. S. Chen (罗艳,陈又生) 442; Qingchuan (青川), F. T. Wang (汪发缵) 22468; Shimian (石棉), C. C. Hsien (谢朝俊) 42637; Tianquan (天全), K. C. Kuan & W. T. Wang (关克俭,王文采) 1958, D. Y. Peng (彭定一) 45650 (CDBI); Ya'an (雅安), Nanshuibeidiao Exped. (南水北调队) 10052; Yanyuan (盐源), Qinghai-Xizang Exped. (青藏队) 12793 (KUN); Yuexi (越西), Sichuan Veg. Exped. (四川植被队) 14042 (PE, CDBI). **Yunnan** (云南): Dali (大理), Forrest 4369 (E), 28057, Q. E. Yang (杨亲二) 9402; Dêqên (德钦), K. M. Feng (冯国楣) 6380; Gongshan (贡山), K. M. Feng (冯国楣) 8232, T. T. Yu (俞德

浚) 19435; Jingdong (景东), S. G. Xu (许朔桂) 5466 (KUN); Lanping (兰坪), H. T. Tsai (蔡希陶) 53752 (KUN); Qiaojia (巧家), B. S. Sun (孙必兴) 1087; Weixi (维西), Q. E. Yang (杨亲二) 98187, 98196; Yiliang (奕良), NE Yunnan Division (滇东北队) 639, 698 (KUN); Yongsheng (永胜), H. T. Tsai (蔡希陶) 51080; Zhenxiong (镇雄), H. T. Tsai (蔡希陶) 52675; Without precise locality, Forrest 28528。

本种是我国乌头属植物中分布较广且变异较大的一个种。它与粗花乌头在花的形态上较为相似,但花瓣的距比唇长,小苞片稳定地着生于花梗基部,叶柄基部明显具鞘,可以区别。

6．高乌头

Aconitum sinomontanum Nakai in Rep. 1st. Sci. Exp. Manch. 4 (2): 146, fig. 9. 1935; Fl. Beijing. 1: 281, fig. 230. 1962; Icon. Corm. Sin. 1: 688, fig. 1375. 1972; Fl. Tsingling. 1 (2): 255, fig. 218. 1974; W. T. Wang in Fl. Reip. Pop. Sin. 27: 168, pl. 28, figs. 1-4. 1979; L. Q. Li & Kadota in Fl. China 6: 164. 2001. Type: China. Hebei (河北): Mt. Xiaowutaishan (小五台山), 1914, Nagai 100 (holotype, TI).

Lycoctonum shansiense Nakai in Bull. Nat. Sci. Mus. Tokyo n. 32: 6. 1953. Type: China. Shanxi (山西): Mt. Wutaishan (五台山), 1942-07-26, Togashi 974 (holotype, NSM).

A. jinchengense L. C. Wang & J. Silba in Phytologia 71: 307, fig. 1: 1-11. 1991. Type: China. Gansu (甘肃): Lanzhou (兰州), alt. 2450 m, 1990-07-06, L. C. Wang (王兰州) 90020 (holotype, in Herb. Dept. Biol. Northwest Norm. Univ.).

多年生草本,高40-150 cm。根粗壮,长可达20 cm。茎中部以下几无毛,上部近花序处被反曲的短柔毛。基生叶与茎生叶都存在;叶片肾形或圆肾形,长12-14.5 cm,宽20-28 cm,基部宽心形,三深裂约至本身长度的6/7处,中裂片楔状狭菱形,渐尖,侧裂片斜扇形,不等三裂,两面疏被短柔毛或无毛;叶柄长30-50 cm,几无毛。总状花序,花密集或疏生;轴和花梗密被紧贴短柔毛;下部苞片叶状,其他苞片线形;小苞片通常生花梗中部,狭线形;萼片淡紫色或蓝紫色,外面密被短柔毛,上萼片圆筒形,高1.6-2.5 cm,外缘在中部缢缩,自基部至喙长1.1-1.5 cm;花瓣无毛,距向后拳卷;雄蕊无毛,花丝大多具1-2枚小齿;心皮3,无毛,或子房背部被紧贴的短柔毛。种子倒卵形,密生横狭翅。花期6-9月。

分布:四川,重庆,贵州,湖南,湖北西部,青海东部,甘肃南部,陕西,山西,河南,河北。

6a. 高乌头 原变种

var. **sinomontanum**

本变种心皮无毛。

分布:四川,重庆,贵州,湖南,湖北西部,青海东部,甘肃南部,陕西,山西,河南,河北。

Chongqing (重庆): Chengkou (城口), Anonymous 102245; Nanchuan (南川), Mt. Jinfoshan Exped. (金佛山考察队) 1479, G. F. Li (李国凤) 61821; Shizhu (石柱), W. H. Wang (王文华) 1484; Wuxi (巫溪), Anonymous 58448. **Gansu** (甘肃): Jonê (卓尼), T. P. Wang (王作宾) 5310; Maqu (玛曲), G. L. Chu (朱格麟) 1784, 1850; Mt. Lianhuashan (莲花山), Rock 12739 (E, NAS); Pingliang (平凉), S. Q. Zhong & P. L. Yang (仲士奇,杨平礼) 128; T'ao River Basin (洮河盆地), Rock 13162 (E, NAS); Têwo (迭部), Rock 13079 (NAS); Yuzhong

(榆中), Yellow River Exped. (黄河队) 3415, P. G. Wu & W. L. Wang (吴培根,王万里) 651048 (NAS). **Guizhou** (贵州): Bijie (毕节), P. H. Yu (禹平华) 708; Leishan (雷山), Anonymous 51296; Nayong (纳雍), Bijie Division (毕节队) 641. **Hebei** (河北): Fuping (阜平), K. M. Liou (刘继孟) 3051; Huailai (怀来), Anonymous 2072; Laiyuan (涞源), Anonymous 2145, K. M. Liou (刘继孟) 2508; Mt. Xiaowutaishan (小五台山), Y. Liu (刘瑛) 10625, C. Y. Yang & Z. G. Li (杨承元,李祖桂) 36251; Neiqiu (内丘), X. Y. Liu (刘鑫源) 1224; Wei Xian (威县), Xiaowutai Division (小五台队) 74163; Zhuolu (涿鹿), W. Y. Hsia (夏纬英) 11490, D. F. Jin (金德福) 251. **Henan** (河南): Lushi (卢氏), Anonymous 34549. **Hubei** (湖北): Badong (巴东), Hubei Bot. Exped. (鄂植考队) s.n.; Hefeng (鹤峰), Y. M. Wang (王映明) 5888; Shennongjia (神农架), Hubei Shennongjia Bot. Exped. (鄂神农架植考队) 10570, 10668, 22927, 30448, 31140; Without precise locality, Henry 5904, 6426 (E), Wilson 1354, 2146, 1354a. **Hunan** (湖南): Sangzhi (桑植), Beijing Division (北京队) 2700; Shimen (石门), Mt. Hupingshan Exped. (壶瓶山考察队) 691, 1300, 1308, 1396. **Ningxia** (宁夏): Guyuan (固原), T. P. Wang (王作宾) 17218; Haiyuan (海源), Yellow River Exped. (黄河队) 5212; Longde (隆德), T. P. Wang (王作宾) 13378. **Qinghai** (青海): Datong (大通), Z. H. Zhang et al. (张志和等) 4296, K. C. Kuan (关克俭) 77311; Huangyuan (湟源), P. C. Tsoong (钟补求) 8856, G. X. Liu & Y. Y. Tian (刘更喜,田玉英) s.n.; Huangzhong (湟中), S. W. Liu (刘尚武) 3020; Huzhu (互助), G. X. Liu (刘更喜) s.n.; Menyuan (门源), Anonymous 2519; Minhe (民和), S. W. Liu (刘尚武) 2729; Xining (西宁), K. S. Hao (郝景盛) 809; Xunhua (循化), Q. E. Yang (杨亲二) 9507. **Shaanxi** (陕西): Foping (佛坪), P. C. Kuo (郭本兆) 1725; Mt. Taibaishan (太白山), Taibai Division (太白队) 58011, T. P. Wang (王作宾) 1865; Yang Xian (洋县), K. T. Fu (傅坤俊) 5272. **Shanxi** (山西): Jiexiu (介休), K. M. Liou (刘继孟) 1318; Mt. Wutaishan (五台山), K. C. Kuan & Y. L. Chen (关克俭,陈艺林) 1853, Y. L. Chen (陈艺林) 1622; Qin Xian (沁县), Anonymous 981. **Sichuan** (四川): Baoxing (宝兴), T. T. Yu (俞德浚) 2188; Dawu (道孚), Sichuan Veg. Exped. (四川植被队) 5807 (PE, CDBI), 5781 (CDBI); Hongyuan (红原), Y. Luo & Y. B. Luo (罗艳,罗毅波) 333; Li Xian (理县), H. Li & C. H. Chow (李馨,周继西) 74285; Nanping (南坪), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 4059 (CDBI); Songpan (松潘), X. N. Tang et al. (唐贤能等) 809 (CDBI); Xiaojin (小金), Sichuan Veg. Exped. (四川植被队) 9776 (PE, CDBI); Zoigê (若尔盖), Sichuan Med. Pl. Exped. (四川药源队) 20645 (NAS).

本变种分布范围广,垂直海拔从1150-3700 m,我国北方大部分地区都有分布 (图6)。本变种与欧洲分布的种*A. moldavicum* Hacquet形态上极为相似,只是地理分布有隔离,Tamura和Lauener (1979)将其处理为*A. moldavicum*的变种。但由于我们还没有详细调查过欧洲分布的乌头属植物,因此仍将它们作为两个种处理。本变种与我国北方分布的白喉乌头*A. leucostomum* Worosch.和紫花高乌头*A. excelsum* Reichb.的关系也很近,仅花梗毛被不同,有关调查工作还有待进行。

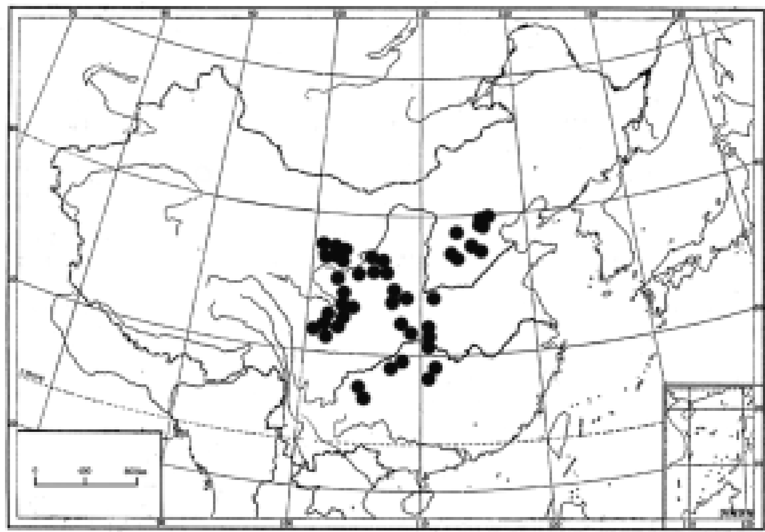


图6 高乌头的分布
Fig. 6. Distribution of *Aconitum sinomontanum.*

6b. 毛果高乌头 变种

var. **pilocarpum** W. T. Wang in Acta Phytotax. Sin. Addit. 1: 62. 1965; W. T. Wang in Fl. Reip. Pop. Sin. 27: 170. 1979; L. Q. Li & Kadota in Fl. China 6: 164. 2001. Type: China. Sichuan (四川): Barkam (马尔康), alt. 3100 m, 1957-06-10, H. Li (李馨) 71474 (holotype, PE!).

本变种与原变种的区别在于子房背部被紧贴的短柔毛。在原变种,子房通常不被毛。

分布:四川西部。

Sichuan (四川): Barkam (马尔康), H. Li (李馨) 71474, 72106, 74475; Hongyuan (红原), Q. S. Zhao (赵清盛) 1207; Jinchuan (金川), The 8th Forest Management Brigade (第八森林经理大队) 4996.

亚属**2.** 乌头亚属

Subgen. 2. **Aconitum**. W. T. Wang in Fl. Reip. Pop. Sin. 27: 179. 1979; Tamura in Hiepko, Natür. Pflanzenf., zweite Aufl., 17a (4): 285. 1995.

Subgen. *Tuberaconitum* Rapaics in Növ.Közl. 6: 139. 1907; Hand.-Mazz. in Acta Hort. Gotob. 13: 85. 1939.

二年生块根,通常有1个或多个子根。萼片无爪或有不明显的短爪;上萼片盔形、船形或镰刀形。花瓣的瓣片顶端或前缘有分泌组织,无或有距;唇不明显或明显,呈舌形或线形。心皮3-5 (-9)。

全世界已知约250种,分布于亚洲和欧洲。乌头亚属的现代分布中心在中国-喜马拉雅植物亚区,在我国集中分布在滇西北、川西南的横断山脉核心区和川西高原地区,东北地区也有不少种类。

乌头亚属植物由于其变异复杂,是分类学中的一个困难类群。叶的分裂程度、上萼片

的形状、茎的习性和分枝、花梗毛被等被认为是重要的分类性状,但是这些性状在不同的居群中甚至是在同一居群中有时也会有一定变异。对物种之间的系统关系更是难以把握。王文采(1979)将我国的乌头亚属植物分为2组,即多果乌头组sect. *Sinaconitum* W. T. Wang和乌头组sect. *Aconitum*。多果乌头组是单型组,其余所有的种都属于乌头组,王文采将乌头组分为11个系。在本文中,我们仍沿用王文采的系统,只是将少数种的位置做了一些变动。四川除多果乌头组和乌头组中的准噶尔乌头系ser. *Grandituberosa*无分布外,其他乌头亚属植物的各组、系都有分布。

乌头组

Sect. **Aconitum** W. T. Wang in Fl. Reip. Pop. Sin. 27: 181. 1979; Tamura in Hiepko, Natür. Pflanzenf., zweite Aufl., 17a (4): 289. 1995, p.p.

Sect. *Napellus* DC., Syst. 1: 371. 1818.

上萼片船形、盔形、高盔形或圆筒形。花瓣的瓣片通常较大,稀较小,顶部有分泌组织,通常多少伸长,形成距,少有无距,通常下部分化成舌形或线形的唇,少有唇不明显。心皮3-5 (-8)。

系**1.** 甘青乌头系

Ser. 1. **Tangutica** W. T. Wang in Fl. Reip. Pop. Sin. 27: 182. 1979.

Subgen. *Tangutica* (W. T. Wang) Kadota in J. Jpn. Bot. 76: 184. 2001, p.p.

块根2,小。有基生叶,茎生叶不发达;叶片掌状深裂。上萼片船形。花瓣的瓣片不发达,很小,距不存在,唇不明显。种子只沿棱生翅。

2种,四川均产。

王文采(1979)认为本系具有乌头属中比较原始的特征,如瓣片很小,距不存在,唇的分化不明显,上萼片船形,种子只沿棱生翅等,可能是一个原始的群。

Kadota(2001)对该系的甘青乌头进行过详细的考察,认为其根部结构为多年生的习性且有分枝,形态极为特殊,与牛扁亚属的根类似,但花部形态与乌头亚属植物相近,因此他提出此系应提升到亚属的位置而区别于乌头亚属和牛扁亚属,同时还包括中亚和喜马拉雅分布的几个种。但通过我们野外观察和标本查阅的结果,此种的根的形态与乌头亚属没有区别,同时解剖学证据(李鸣等, 1991)也支持甘青乌头的根与牛扁亚属不同,而与乌头亚属相同,因此我们不支持Kadota (2001)的观点,认为还是应该将其放在乌头亚属中,不宜独立成为一个亚属。

7. 甘青乌头

Aconitum tanguticum (Maxim.) Stapf in Ann. Roy. Bot. Gard. Calc. 10: 151. 1905; Hand.-Mazz. in Acta Hort. Gotob. 13: 90. 1939; Hsiao & W. T. Wang in Acta Pharm. Sin. 12: 689. 1965; Icon. Corm. Sin. 1: 697, fig. 1394. 1972; Fl. Tsingling. 1 (2): 261, fig. 223. 1974; W. T. Wang in Fl. Reip. Pop. Sin. 27: 182, pl. 33, figs. 1-4. 1979; et in C. Y. Wu, Fl. Xizang. 2: 22, fig. 5: 1, 2. 1985; Kadota in Natur. Environ. Sci. Res. 11: 1, figs. 1-3. 1998; L. Q. Li & Kadota in Fl. China 6: 168. 2001. ——*A. rotundifolium* Kar. & Kir. var. *tanguticum* Maxim. in Fl. Tangut. 26. 1889; Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 516. 1904. Type: China. Gansu (甘肃): Burchan Budda, alt. 3900-4600 m, 1884-08-13, Przewalski 391 (lectotype, designated by Kadota in l.c., LE; isolectotype, K!).

A. tanguticum var. *trichocarpum* Hand.-Mazz. in Acta Hort. Gotob. 13: 91. 1939; Fl. Tsingling. 1 (2): 262. 1974; W. T. Wang in Fl. Reip. Pop. Sin. 27: 184. 1979; et in C. Y. Wu, Fl. Xizang. 2: 22. 1985; L. Q. Li & Kadota in Fl. China 6: 168. 2001; Y. Luo & Q. E. Yang in Acta Phytotax. Sin. 40: 473. 2002. Type: China. Sichuan (四川): Songpan (松潘), Dongrego, in alpine meadows, alt. 4300 m, H. Smith 3817 (holotype, W; isotype, PE!).

A. tanguticum f. *viridulum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 96. 1965. Type: China. Yunnan (云南): Zhongdian (中甸), alt. 3600 m, 1938-07-26, T. T. Yu (俞德浚) 12459 (holotype, PE!; isotype, KUN!).

A. tanguticum f. *robustum* (Chen & Liu) W. T. Wang in Acta Phytotax. Sin. Addit. 1: 96. 1965. —— *A. iochanicum* Ulbr. var. *robustum* Chen & Liu in Bull. Fan Mem. Inst. Biol., Bot. Ser. 1: 46. 1941. Type: China. Yunnan (云南): Dêqên (德钦), on rocky slope, alt. 4130 m, 1937-07-26, T. T. Yu (俞德浚) 9193 (holotype, KUN!).

A. wolongense W. T. Wang in Bull. Bot. Res. 9 (2): 1, fig. 1: 2-5. 1989, p.p.; L. Q. Li & Kadota in Fl. China 6: 173. 2001, p.p. Type: China. Sichuan (四川): Wenchuan (汶川), 1984, Chengdu Chin. Trad. Med. College (成都中医学院) 85014, the lower specimen on the sheet (lectotype, PE!).

A. qinghaiense Kadota in J. Jpn. Bot. 76: 185, figs. 1-3, 4A. 2001; L. Q. Li & Kadota in Fl. China 6: 168. 2001, syn. nov. Type: China. Qinghai (青海): Huangzhong (湟中), alt. 3560 m, 1999-07-28, Kadota 994010 (holotype, TNS).

多年生草本,高8-50 cm。块根小,纺锤形或倒圆锥形。茎疏被短柔毛或几无毛。基生叶7-9枚,有长柄;叶片圆形或圆肾形,长1.1-3 cm,宽2-6.8 cm,三深裂至中部或中部之下,深裂片互相覆压,深裂片浅裂,边缘有圆牙齿,两面无毛;叶柄长3.5-14 cm,无毛,基部具鞘。茎生叶1-2枚,较小具短柄。顶生花序总状;轴和花梗密被反曲的短柔毛;苞片线形;小苞片生花梗上部或与花近邻接;萼片蓝紫色,偶尔淡绿色,外面被短柔毛,上萼片船形,高6-8 mm,自基部至喙长1.4-2.2 cm,下缘稍凹或近直,下萼片宽卵形或椭圆状卵圆形,花瓣无毛,瓣片极小,唇不明显,微凹,距短,直;花丝疏被毛,全缘或有2小齿;心皮5,无毛或有毛。种子倒卵形,具三纵棱,只沿棱生狭翅。花期7-9月。

分布:四川西部,云南西北部,西藏东部,青海东部,甘肃南部及陕西秦岭。

Gansu (甘肃): Maqu (玛曲), G. L. Chu (朱格麟) 4160, Aba Inst. Drug Control (阿坝州药检所) 330 (MS); Min Xian (岷县), T. P. Wang (王作宾) 7524; Sunan (肃南), Hexi Division (河西队) 213, 373, 385; Xiahe (夏河), K. T. Fu (傅坤俊) 1484. **Qinghai** (青海): Datong (大通), K. M. Liou (刘继孟) 6732; Huangyuan (湟源), K. M. Liou (刘继孟) 6709; Huangzhong (湟中), S. W. Liu (刘尚武) 3153; Huzhu (互助), P. C. Kuo (郭本兆) 9409, Q. E. Yang (杨亲二) 9525; Menyuan (门源), K. M. Liou (刘继孟) 6708; Qilian (祁连), P. C. Tsoong (钟补求) 8609; Xunhua (循化), Q. E. Yang (杨亲二) 9510. **Shaanxi** (陕西): Mt. Taibaishan (太白山), T. N. Liou & P. C. Tsoong (刘慎谔,钟补求) 837, 986. **Sichuan** (四川): Baoxing (宝兴), Baoxing Division (宝兴队) 78-824 (MS); Barkam (马尔康), Sichuan Veg. Exped. (四川植被队) 9251 (PE, CDBI), Anonymous 22327 (MS); Batang (巴塘), Sichuan Veg. Exped. (四川植

被队) 1640 (PE, CDBI); Dawu (道孚), Garzê Pl. (甘孜州植物) 270 (MS); Dêgê (德格), Sichuan Veg. Exped. (四川植被队) 15184 (MS), Survey Exped. (普查队) 643 (MS); Garzê (甘孜), Sichuan Med. Pl. Exped. (四川药源队) 15509 (CDBI); Hongyuan (红原), H. Li (李馨) 74097,B. Z. Ni (倪炳炽) 330 (CDBI), Sichuan Veg. Exped. (四川植被队) 10453 (CDBI), Y. Luo & Y. B. Luo (罗艳,罗毅波) 338, 339; Jinchuan (金川), The 8th Forest Management Brigade (第八森林经理大队) 4968; Jiulong (九龙), Z. A. Liu (刘志安) 22962 (CDBI), W. G. Hu (胡文光) 20944 (CDBI), Garzê Pl. (甘孜州植物) 160 (CDBI, MS); Kangding (康定), W. P. Fang (方文培) 36633; Li Xian (理县), C. L. Wu (吴中伦) 33019, Y. Luo & Y. B. Luo (罗艳,罗毅波) 309; Luding (泸定), Sichuan Veg. Exped. (四川植被队) 31404 (CDBI); Luhuo (炉霍), Survey Exped. (普查队) 205 (MS); Nanping (南坪), Aba Inst. Drug Control (阿坝州药检所) 907 (MS); Pingwu (平武), Miandi Division (绵地队) 538 (MS); Sêrtar (色达), X. H. Wu (伍兴汉) 6604 (PE, CDBI); Sêrxü (石渠), Garzê Pl. (甘孜州植物) 413 (MS); Songpan (松潘), W. P. Fang (方文培) 13464; Wenchuan (汶川), Chengdu Chin. Trad. Med. College (成都中医学院) 85014 (标本下半部分); Xiangcheng (乡城), Qinghai-Xizang Exped. (青藏队) 3878 (CDBI), Garzê Pl. (甘孜州植物) 645 (MS); Xiaojin (小金), Sichuan Veg. Exped. (四川植被队) 9735 (PE, CDBI), Y. Luo & Y. B. Luo (罗艳,罗毅波) 391, 402; Xinlong (新龙), Survey Exped. (普查队) 34 (MS); Zamtang (壤塘), Aba Inst. Drug Control (阿坝州药检所) 784; Zoigê (若尔盖), Aba Inst. Drug Control (阿坝州药检所) 262 (MS). **Xizang** (西藏): Baqên (巴青), D. D. Tao (陶德定) 11080; Biru (比如), D. D. Tao (陶德定) 11162 (PE, KUN), 11391; Cona (错那), Supplementary Qinghai-Xizang Exped. (青藏补点组) 751962 (KUN); Gyaca (加查), Qinghai-Xizang Exped. (青藏队) 7654 (KUN); Lhasa (拉萨), Y. T. Chang & K. Y. Lang (张永田,郎楷永) 2518 (KUN); Qamdo (昌都), Qinghai-Xizang Exped. (青藏队) 12794; Sog Xian (索县), Qinghai-Xizang Exped. Nagqu Division (青藏队那曲分队) 10978 (KUN). **Yunnan** (云南): Dêqên (德钦), Forrest 13237, C. W. Wang (王启无) 69542, J. S. Yang (杨竞生) 8838, 8554 (KUN), Q. E. Yang (杨亲二) 8916 (KUN); Zhongdian (中甸), T. T. Yu (俞德浚) 12459 (PE, KUN), T. T. Yu (俞德浚) 9339 (KUN), J. S. Yang (杨竞生) 8307 (KUN); Without precise locality, Forrest 28658.

本种广布于青藏高原东部,在云南西北部也有分布(图7)。其花部形态比较特殊,易与近缘种区分。我们同意Kadota(1998)将毛果甘青乌头归并的处理。Handel-Mazzetti于1939年在甘青乌头下建立的毛果变种与原变种的区别是心皮被毛,而在原变种心皮是无毛的。我们在野外观察发现这一性状在该种中并不稳定,在同一居群中都有变化,如我们在理县鹧鸪山采集到的甘青乌头(罗艳,罗毅波309)和红原刷经寺的居群(罗艳,罗毅波338,339)的心皮毛被在同一居群中都有变化,只是在小金夹金山(罗艳,罗毅波391)和巴朗山(罗艳,罗毅波402)观察到的植物心皮都被毛。另外二者的分布区域也无间断,因此我们认为心皮的毛被特征不稳定,同意将它们合并。Kadota(2001)描述了青海乌头*A. qinghaiense* Kadota。他认为其花瓣形态与本种有区别,但据我们观察,本种的花瓣分化不完全,没有唇和瓣片的分化,形态呈现多样化,Kadota据此成立新种,我们认为是不恰当的,因此将它合并。

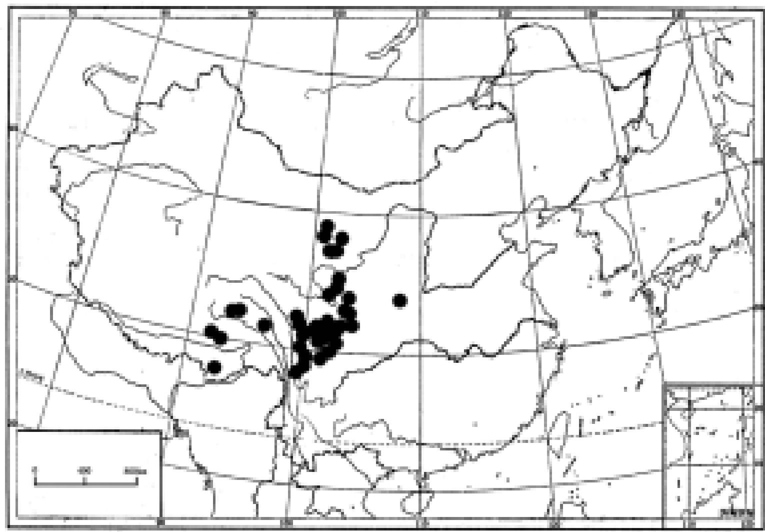


图7 甘青乌头的分布
Fig. 7. Distribution of *Aconitum tanguticum*.

8. 螺瓣乌头

Aconitum spiripetalum Hand.-Mazz. in Acta Hort. Gotob. 13: 91. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 184, pl. 33, figs. 7, 8. 1979; L. Q. Li & Kadota in Fl. China 6: 168. 2001. Type: China. Sichuan (四川): Dawu (道孚), grassy slope, alt. 4200 m, 1934-08-31, H. Smith 11711 (holotype, W; isotype, PE!).

多年生草本,高10-45 cm。块根小,圆球形。茎被反曲而紧贴的短柔毛,不分枝。基生叶7-9枚,有长柄;叶片圆形或圆肾形,长1.1-3 cm,宽2-6.8 cm,三深裂至中部或中部之下,深裂片互相覆压,深裂片浅裂,边缘有圆牙齿,两面无毛。茎生叶1-2枚,小,不发达,具短柄。总状花序,花密集成头状;轴和花梗被反曲的短柔毛;基部苞片叶状或三裂,上部苞片线形;花梗长1-3.5 cm;小苞片生花梗上部或中部,线形;萼片灰黄色带有紫色条纹,外面疏被短柔毛,上萼片盔状船形,高0.8-1 cm,自基部至喙长1.5-1.7 cm,下缘微凸;花瓣无毛,爪细,顶部向前螺旋状弯曲,瓣片极短,唇不明显,近无距;花丝被短毛,全缘;心皮5,疏被长柔毛。种子倒卵形,具3纵棱,只沿棱生狭翅。花期8-9月。

分布:四川西部。

Sichuan (四川): Dawu (道孚), Smith 11711; Kangding (康定), C. S. Liu (刘振书) 1447, K. C. Kuan & W. T. Wang (关克俭,王文采) 1081; Li Xian (理县), Z. He & Z. L. Zhou (何铸,周子林) s.n.; Luding (泸定), Veg. Exped. (植被组) 31313 (CDBI); Mao Xian (茂县), Z. He (何铸) 13722 (SZ); Xiaojin (小金), Y. Luo & Y. B. Luo (罗艳,罗毅波) 393, 403。

本种为四川西部特有,与甘青乌头非常相似,但花瓣的爪顶部螺旋状弯曲而与甘青乌头相区别。另外两者上萼片的形状也略有不同,在该种上萼片下缘稍凸,而在甘青乌头上萼片下缘稍凹。本种的花色也较为特殊,暗黄色带有紫色条纹,四川其他乌头亚属植物的花多为紫色或蓝紫色。

系**2.** 圆叶乌头系

Ser. 2. **Rotundifolia** Steinb. in Fl. URSS 7: 229. 1937; W. T. Wang in Fl. Reip. Pop. Sin. 27: 186. 1979.

块根2,常小。基生叶数个,掌状深裂至全裂,一回裂片浅裂至细裂。小苞片钻形。上萼片船形或盔形。花瓣的瓣片不膨大,有向前或向后弯曲的短距,唇明显。种子只沿棱生翅或有横膜翅。

9. 美丽乌头

Aconitum pulchellum Hand.-Mazz. in Sitzgsanz. Akad. Wiss. Wien Math.-Nat. Kl. 62: 219. 1925; et Symb. Sin. 7: 286. 1931; et in Acta Hort. Gotob. 13: 93. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 204. 1950; W. T. Wang in Acta Phytotax. Sin. Addit. 1: 95. 1965; et in Fl. Reip. Pop. Sin. 27: 191, pl. 33, figs. 5, 6. 1979; et in C. Y. Wu, Fl. Xizang. 2: 24. 1985; Icon. Corm. Sin. 1: 697, fig. 1393. 1972; Q. E. Yang in Acta Phytotax. Sin. 37: 555. 1999; L. Q. Li & Kadota in Fl. China 6: 170. 2001. Type: China. Yunnan (云南): Dêqên (德钦), 1915-09-17, Handel-Mazzetti 8074 (holotype, W; isotype, E!).

A. handelianum Comber in Not. Bot. Gard. Edinb. 18: 224. 1934; Hand.-Mazz. in Acta Hort. Gotob. 13: 93. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 202. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 298. 1979; L. Q. Li & Kadota in Fl. China 6: 214. 2001. Type: China. Yunnan (云南): Jianchuan (剑川), among scrub and heavy grass on the margins of thickets, alt. 3600 m, 1922-09, Forrest 22257 (holotype, E).

A. pulchellum var. *racemosum* W. T. Wang in Fl. Reip. Pop. Sin. 27: 605. 1979; L. Q. Li & Kadota in Fl. China 6: 171. 2001. Type: China. Yunnan (云南): Dêqên (德钦), alt. 4200 m, 1976-08, J. S. Yang (杨竞生) s.n. (holotype, PE!).

多年生草本,高6-50 cm。块根小,倒圆锥形。茎无毛或疏被白色长绢毛。基生叶2-3枚,有长柄;叶片圆五角形,长1-2 cm,宽2-3.5 cm,三全裂或三深裂至近基部,两面无毛;叶柄长2.5-14.5 cm,无毛,基部具短鞘。茎生叶1-2,生茎下部或中部,较小。总状花序伞房状,花小,有1-4朵花;轴和花梗被反曲和伸展的混杂毛;基部苞片叶状,上部苞片线形;小苞片生花梗中部附近,线形;萼片蓝色或淡蓝紫色,外面疏被短柔毛或几无毛,上萼片船形或盔状船形,高0.5-0.7 cm,自基部至喙长1.7-2 cm;花瓣无毛,瓣片上部微凸,距长约1.5 mm,向后弯曲;雄蕊无毛或花丝上极稀被毛,花丝全缘;心皮5,子房被伸展的黄色柔毛。花期8-9月。

分布:四川西部,云南西北部,西藏东南部;锡金,不丹,缅甸北部。

China. Sichuan (四川): Barkam (马尔康), H. Li (李馨) 71797 (SZ); Between Merge and Sanker, Smith 4323; Daocheng (稻城), T. T. Yu (俞德浚) 12832 (KUN), Qinghai-Xizang Exped. (青藏队) 5553, 5883 (KUN, CDBI), Y. Luo & Y. B. Luo (罗艳,罗毅波) 407; Dawu (道孚), Sichuan Med. Pl. Exped. (四川药源队) 15802 (NAS); Hongyuan (红原), Anonymous 10458; Jinchuan (金川), H. Li (李馨) 78693 (PE, NAS); Kangding (康定), Y. Luo & Y. B. Luo (罗艳,罗毅波) 383; Muli (木里), Qinghai-Xizang Exped. (青藏队) 14497, 12856 (KUN); Xiangcheng (乡城), Qinghai-Xizang Exped. (青藏队) 5001, 5079 (KUN, CDBI); Xiaojin (小金), J. S. Yue et al. (岳俊三等) 64114 (NAS), Y. Luo & Y. B. Luo (罗艳,罗毅波) 401; Yajiang

(雅江), Y. Luo & Y. B. Luo (罗艳,罗毅波) 362, 370. **Xizang** (西藏): Baxoi (八宿), Qinghai-Xizang Exped. (青藏队) 73-1156 (KUN); ZaYu (察隅), C. W. Wang (王启无) 65630, Qinghai-Xizang Exped. (青藏队) 73-11196, 10203, 10624 (KUN). **Yunnan** (云南): Dêqên (德钦), Forrest 13353, T. T. Yu (俞德浚) 9676, K. M. Feng (冯国楣) 6875, 6595, J. S. Yang (杨竞生) s.n., 8586, 8753 (KUN), H. Sun & Z. G. Qian (孙航,钱子刚) 805 (KUN), W. M. Chu et al. (朱维明等) 17156, Q. E. Yang (杨亲二) 8919, 8925, 8926 (KUN); W Yunnan (云南西部), without precise locality, Forrest 30578, 30781; Weixi (维西), Z. D. Fang & X. H. Li (方震东, 李新华) 367 (KUN); Zhongdian (中甸), K. M. Feng (冯国楣) 2182 (KUN), A. L. Zhang (张敖罗) 101092 (KUN), Zhongdian Division (中甸队) 1730 (KUN), J. S. Yang (杨竞生) 88-323, 83-397, Z. G. Qian & Z. D. Fang (钱子刚,方震东) 425.

Myanmar: Upper Burma, Forrest 27446。

本种在体态、花序长短及花序轴和花梗上的毛被等方面都有较大的变化,但花部形态和叶的形态都比较稳定。在我们查看标本时,发现本种四川的标本长期以来大多都被鉴定为疏毛剑川乌头*A. handelianum* var. *laxipilosum* Hand.-Mazz.。杨亲二(1999)认为剑川乌头*A. handelianum* Comber只是本种的一些较高的类型,已归并,同时他也提到疏毛剑川乌头也属于这样的情况。我们的研究结果也与他的一致,美丽乌头其实在四川分布很广(图8),其花序长短及花序轴和花梗上的毛被特征都不是很稳定,我们在野外观察的活植物中,多数个体花梗毛被都是混杂的,植株的高矮则要看其生境,生长在湿地的植株多数高大柔弱,生长在干燥草甸上的植株则矮小。但是鉴于疏毛剑川乌头的合模式我们没有全部检查到,故对其分类处理还要留待以后研究。

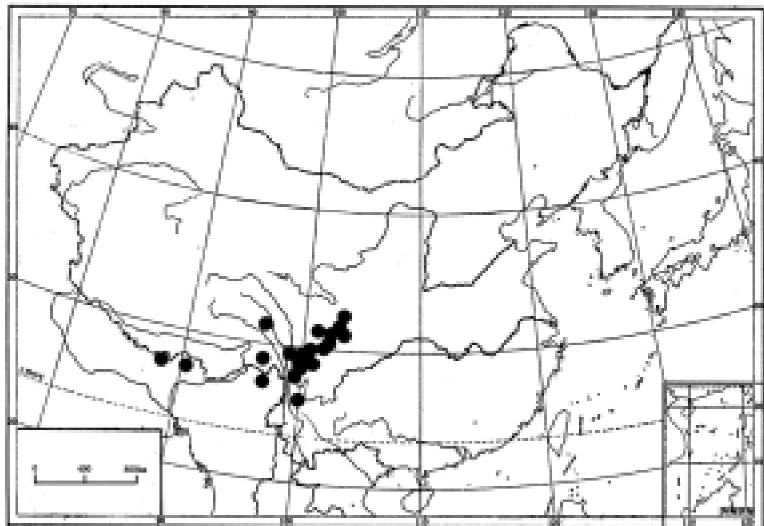


图**8** 美丽乌头的分布

Fig. 8. Distribution of *Aconitum pulchellum.*

系**3.** 保山乌头系

Ser. 3. **Bullatifolia** W. T. Wang in Acta Phytotax. Sin. Addit. 1: 93. 1965; W. T. Wang in Fl. Reip. Pop. Sin. 27: 193. 1979.

块根2。茎直立。基生叶1-3,或不存在;叶片掌状全裂,一回裂片浅裂或细裂。小苞片宽,椭圆形或长圆形。上萼片船状盔形或盔形。花瓣的瓣片较大。距不存在或很短。种子有横膜翅。

10. 保山乌头

Aconitum nagarum Stapf in Ann. Roy. Bot. Gard. Calc. 10: 176, pl. 113. 1905; Hand.-Mazz. in Acta Hort. Gotob. 13: 89. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 193. 1979; Q. E. Yang in Acta Phytotax. Sin. 37: 555. 1999; Kadota in Natur. Environ. Sci. Res. 13: 25, figs. 1A, B, 2A, B, 3A. 2000; L. Q. Li & Kadota in Fl. China 6: 171. 2001. Type: India. Assam: Naga hills, District Kohima, 1885-10-25, Clarke 41332A (holotype, K!).

A. ventorium Diels in Not. Bot. Gard. Edinb. 5: 269. 1912. Type: China. Yunnan (云南): Mekong-Irrawadi divide, alt. 2700-3000 m, 1905-10, Forrest 826 (lectotype, designated by Q. E. Yang in l.c., E!).

A. ventorium var. *ecalcaratum* Airy-Shaw in Kew Bull. 1932: 245. 1932. —— *A. nagarum* var. *ecalcaratum* (Airy-Shaw) Airy-Shaw in Kew Bull. 1935: 579. 1935. ——*A. nagarum* f. *ecalcaratum* (Airy-Shaw) W. T. Wang in Fl. Reip. Pop. Sin. 27: 194. 1979. Type: China. Yunnan (云南): Tengchong (腾冲), Forrest 25996 (lectotype, designated by Q. E. Yang in l.c., E!).

多年生草本,高40-100 cm。块根近圆柱形,较粗。茎下部变无毛,上部疏被弯曲并紧贴的短柔毛。基生叶具长柄;叶片五角状肾形,长5-8.5 cm,宽10-15 cm,三全裂或裂至近基部,裂片菱形至条形,叶表面几无毛,背面疏被紧贴的短柔毛;叶柄长达48 cm,几无毛,有短鞘;茎生叶近基部具长柄,渐变小。总状花序长12-30 cm,有6-25朵花;下部苞片三裂,上部苞片狭卵形;轴和花梗均被开展的黄色腺毛,或密被弯曲并紧贴的白色短柔毛;花梗长2-4.5 cm;小苞片生花梗的基部或下部,狭卵形;萼片蓝紫色,外面被白色短柔毛,上萼片船状盔形,高0.8-1 cm,自基部至喙长约1.8 cm,下缘斜向上;花瓣无毛,具短距;雄蕊无毛,花丝全缘;心皮5,子房密被白色短柔毛。花期9-10月。

分布:四川西南部,云南西部;缅甸北部,印度东北部。

10a. 保山乌头 原变种

var. **nagarum**

本变种的花序轴和花梗通常密被贴伏的白色短柔毛。

分布:四川西南部,云南西部;缅甸北部,印度东北部。

Sichuan (四川): Miyi (米易), Y. Luo & Y. S. Chen (罗艳,陈又生) 550; Puge (普格), Puge Division (普格队) 850, Anonymous 425; Xide (喜德), Liangshan Med. Pl. (凉山中草药) 942. **Yunnan** (云南): Baoshan (保山), C. Chen (陈介) 163 (KUN), S. P. Yu (于世平) 62014, R. Y. He (何仁远) 62008, 62009, 62010, J. S. Yang (杨竞生) 1344 (KUN); Fugong (福贡), Y. Luo & Y. S. Chen (罗艳,陈又生) 483; Lushui (泸水), S. K. Wu (武素功) 8381 (KUN),

Bijiang Division (碧江队) 1783 (KUN), D. M. Zhang (张大明) s.n. (KUN); Tengchong (腾冲), Forrest 27390, D. M. Zhang (张大明) 89259 (KUN), J. Zhou (周俊) s.n. (KUN); Yunlong (云龙), F. G. Pan (潘福根) 8402 (KUN)。

Myanmar: Upper Burma, Forrest 27444。

10b. 小白撑 变种

var. **acaule** (Finet & Gagnep.) Q. E. Yang in Acta Phytotax. Sin. 37: 555. 1999. ——A. *napellus* var. *acaule* Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 512. 1904. ——*A. acaule* (Finet & Gagnep.) Diels in Not. Bot. Gard. Edinb. 5: 269. 1912. Type: China. Yunnan (云南): Dali (大理), alt. 2800 m, 1884-09-10, Delavay 1209 (holotype, P!).

A. duclouxii Lévl. in Rep. Sp. Nov. 7: 99. 1909; Airy-Shaw in Kew Bull. 1932: 243. 1932; Hand.-Mazz., Symb. Sin. 7: 289. 1931; et in Acta Hort. Gotob. 13: 89. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 189, pl. 266, fig. 14. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 197. 1979; Q. E. Yang in Acta Phytotax. Sin. 37: 557. 1999; Kadota in Natur. Environ. Sci. Res. 13: 28, figs. 1C, D, 2C, D, 4A. 2000; L. Q. Li & Kadota in Fl. China 6: 172. 2001. Type: China. Yunnan (云南): Binchuan (宾川), 1906-08, Delavay 576 (holotype, E!).

A. bullatifolium Lévl., Cat. Pl. Yunnan. 218. 1917; Icon. Corm. Sin. 1: 696, fig. 1392. 1972. Type: China. Yunnan (云南): Qiaojia (巧家), alt. 3200 m, 1912-11, Maire s.n. (holotype, E!).

A. coriophyllum Hand.-Mazz. in Sitzgsanz. Akad. Wiss. Wien Math.-Nat. Kl. 62: 220. 1925; et Symb. Sin. 7: 292, fig. 5: 1; t. 6, figs. 4, 5. 1931; et in Acta Hort. Gotob. 13: 90. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 200. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 193. 1979; Icon. Corm. Sin. 1: 697, fig. 1393. 1972. Type: China. Yunnan (云南): Zhongdian (中甸), rocky slope, alt. 2600 m, 1916-10-18, Handel-Mazzetti 12994 (holotype, WU; isotypes, E, K!).

A. dielsianum Airy-Shaw in Kew Bull. 1932: 244. 1932. ——*A. bullatifolium* var. *dielsianum* (Airy-Shaw) Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 191. 1950. Type: China. Yunnan (云南): Lijiang (丽江), on open grassy ledges of cliffs, alt. 3000-3300 m, 1906-10, Forrest 3089 (lectotype, E!; isolectotype, PE!).

A. nagarum var. *heterotrichum* Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 203. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 194, pl. 36, figs. 1-3. 1979; L. Q. Li & Kadota in Fl. China 6: 172. 2001. Type: Myanmar. Chawchi, Farrer 1896 (holotype, E!).

A. bullatifolium var. *leiocarpum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 93. 1965. ——*A. nagarum* var. *heterotrichum* f. *leiocarpum* (W. T. Wang) W. T. Wang in Fl. Reip. Pop. Sin. 27: 196. 1979. Type: China. Yunnan (云南): Jingdong (景东), Mt. Wuliangshan (无量山), 1956-11-16, M. K. Li (李鸣岗) 783 (holotype, PE!; isotype, KUN!).

与原变种的区别在于花序轴和花梗通常均被开展的黄色腺毛。在原变种,花序轴和花梗通常均被贴伏的白色短柔毛。

分布:四川西南部,云南;缅甸北部。

Sichuan (四川): Yanyuan (盐源), Handel-Mazzetti 5385 (WU). **Yunnan** (云南): Binchuan (宾川), R. C. Ching (秦仁昌) 24711 (KUN); Dali (大理), Forrest 11695, 27956, H. C. Wang (王汉臣) 1463,4562; Dongchuan (东川), S. B. Lan (蓝顺彬) 209; Fugong (福贡), S. K. Wu (武素功) 8768, 8815, 8844 (KUN), Q. E. Yang (杨亲二) 8938 (KUN); Gongshan (贡山), C. W. Wang (王启无) 6734, K. M. Feng (冯国楣) 76345; Jingdong (景东), B. Y. Qiu (邱炳云) 53760, 53773, M. K. Li (李鸣岗) 783; Lijiang (丽江), Forrest 3089; Menglian (孟连), Y. Y. Qian (钱义咏) 2697; Qiaojia (巧家), H. T. Tsai (蔡希陶) 52051 (KUN); Tengchong (腾冲), J. Z. Zhao (赵嘉志) 18 (KUN); W Yunnan (云南西部), without precise locality, Forrest 28955, 30577, 30953; Weixi (维西), C. W. Wang (王启无) 67655, Q. E. Yang (杨亲二) 8927 (KUN); Xundian (寻甸), Anonymous 3155; Yangbi (漾濞), Z. H. Yang (杨增宏) 101839, C. C. Lü (吕春朝) 62081 (KUN), P. I. Mao (毛品一) 250; Yunlong (云龙), F. G. Pan (潘福根) 84-02 (KUN)。

保山乌头及其变种小白撑以前在四川没有记载过,我们通过查看大量标本和野外调查,发现在四川西南部也有分布(图9)。它们的叶形变化非常大,叶片的分裂程度比较稳定,基本上都为全裂或近全裂,但裂片的分裂程度变化很大。

系**4.** 褐紫乌头系

Ser. 4. **Brunnea** W. T. Wang in Acta Phytotax. Sin. Addit. 1: 73. 1965; et in Fl. Reip. Pop. Sin. 27: 199. 1979.

块根2。茎直立。基生叶不存在;叶片掌状深裂,一回裂片浅裂。花小;上萼片船形或船状盔形。花瓣无距或有很短的距。唇明显。种子只沿棱生翅,无横膜翅。

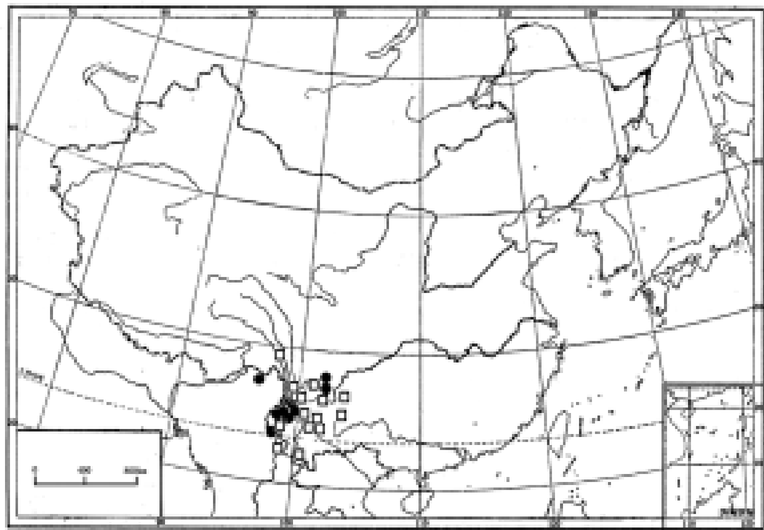


图**9** 保山乌头(●)和小白撑(□)的分布

Fig. 9. Distribution of *Aconitum nagarum* var. *nagarum* (●) and var. *acaule* (□).

11. 褐紫乌头

Aconitum brunneum Hand.-Mazz. in Acta Hort. Gotob. 13: 103. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 201, pl. 37, figs. 1-7. 1979; L. Q. Li & Kadota in Fl. China 6: 174. 2001. Type: China. Sichuan (四川): Dawu (道孚), in grassy areas under *Abies* woods, alt. 3800 m, 1934-09-12, H. Smith 12104 (holotype, W; isotype, PE!).

多年生草本,高85-110 cm。块根椭圆球形或近圆柱形。茎无毛或近无毛,在近花序处被反曲的短柔毛。叶片肾形或五角形,三深裂至本身长度的4/5或6/7处,中央深裂片倒卵形、倒梯形或菱形,三浅裂,两面无毛;下部叶柄长20-25 cm,具鞘,中部以上的叶柄渐变短,几无鞘。总状花序具15-30朵花,花小;轴和花梗密被反曲的短柔毛;最下部的苞片三裂,其他苞片线形;小苞片生花梗下部至上部,狭线形;萼片褐紫色或灰紫色,外面疏被短柔毛,上萼片船形,自基部至喙长约1 cm,下缘稍凹;花瓣疏被短柔毛或几无毛,瓣片顶端圆,无距;雄蕊无毛,花丝全缘;心皮3,疏被短柔毛或无毛。花期8-9月。

分布:四川西北部,甘肃西南部。

Gansu (甘肃): Min Xian (岷县), T. P. Wang (王作宾) 7648; Without precise locality, K. T. Fu (傅坤俊) 1564. **Sichuan** (四川): Dawu (道孚), W. G. Hu & Z. He (胡文光,何铸) 10974, Smith 12104; Dêgê (德格), Y. W. Tsui (崔友文) 4503; Garzê (甘孜), S. Jiang & T. L. Chin (姜恕,金存礼) 2412 (PE, KUN); Kangding (康定), Anonymous 330 (KUN); Songpan (松潘), Q. E. Yang (杨亲二) 92025; Yajiang (雅江), K. Y. Lang et al. (郎楷永等) 2878 (KUN)。

12. 小花乌头

Aconitum pseudobrunneum W. T. Wang in Acta Bot. Yunnan. 4: 129, fig. 1: 5-8. 1982; L. Q. Li & Kadota in Fl. China 6: 175. 2001. Type: China. Sichuan (四川): Xiangcheng (乡城), in moist place in valley, alt. 3900-4000 m, 1981-08-12, Qinghai-Xizang Exped. (青藏队) 4749 (holotype, PE!; isotype, KUN!).

多年生草本,高约50 cm。块根小,倒卵形。茎无毛。茎下部的叶具长柄,无毛;叶片纸质,圆五角形,长3.2-3.5 cm,宽5-7 cm,基部心形;三深裂至基部6-9 mm,中央深裂片菱形,叶片边缘有圆齿;叶柄长3.5-13 cm。总状花序长约14 cm,约15朵花;轴和花序密被反曲的短柔毛;最下部的苞片三裂,其他苞片线形;小苞片生花梗基部或近基部,狭线形;花梗长3-7 mm;萼片深紫色,外面疏被短柔毛,上萼片盔形,高0.7-1.1 cm,自基部至喙长约1.1 cm,在中部缢缩,形成长喙;花瓣疏被毛,无距;雄蕊无毛,花丝全缘;心皮3,无毛。花期8-9月。

分布:四川乡城,云南中甸。

Sichuan (四川): Xiangcheng (乡城), Qinghai-Xizang Exped. (青藏队) 4749 (PE, KUN). **Yunnan** (云南): Zhongdian (中甸), J. S. Yang (杨竞生) 84-730.

本种与褐紫乌头极为相近,仅上萼片的形状有区别,后者的上萼片船形,前面不缢缩,具短喙。

系**5.** 显柱乌头系

Ser. 5. **Stylosa** W. T. Wang in Acta Phytotax. Sin. Addit. 1: 65. 1965; et in Fl. Reip. Pop. Sin. 27: 202. 1979.

块根2,或较多,束生。茎直立,偶尔蔓生或上部缠绕。基生叶不存在;茎下部叶在开花

时枯萎;叶片掌状深裂,少有全裂。一回裂片浅裂。侧萼片长在1 cm以上;上萼片盔形、高盔形,少有船形。花瓣瓣片不膨大,有距,唇明显。种子有膜质横翅。

13. 膝瓣乌头 图10

Aconitum geniculatum Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 201. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 205, pl. 40, figs. 4, 5. 1979; Q. E. Yang in Acta Phytotax. Sin. 37: 563. 1999; L. Q. Li & Kadota in Fl. China 6: 175. 2001. Type: China. Yunnan (云南): Huize (会泽), alt. 3200 m, 1913-07, Maire 259 (holotype, E!).

A. geniculatum var. *unguiculatum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 73. 1965; et in Fl. Reip. Pop. Sin. 27: 207, pl. 40, figs. 6-8. 1979; L. Q. Li & Kadota in Fl. China 6: 176. 2001. Type: China. Yunnan (云南): Luquan (禄劝), alt. 3500-3600 m, 1952-05-28, P. I. Mao (毛品一) 1055 (holotype, PE!; isotype, KUN!).

A. geniculatum var. *humilius* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 73. 1965; et in Fl. Reip. Pop. Sin. 27: 207. 1979; L. Q. Li & Kadota in Fl. China 6: 160. 2001. Type: China. Sichuan (四川): Puge (普格), alt. 3600 m, 1959-08-24, Sichuan Econ. Pl. Exped. (四川经济植物调查队) 5476 (holotype, PE!; isotype, KUN!).

A. pukeense W. T. Wang in Acta Phytotax. Sin. Addit. 1: 66, pl. 1, fig. 4. 1965; et in Fl. Reip. Pop. Sin. 27: 207, pl. 32, figs. 9-11. 1979; et in Bull. Bot. Res. 3 (1): 26. 1983; L. Q. Li & Kadota in Fl. China 6: 177. 2001. Type: China. Sichuan (四川): Puge (普格), bamboo scrub in valley, alt. 3500 m, 1960-08-03, Sichuan Med. Pl. Exped. (四川药源队) 25004 (holotype, MS!; isotype, NAS!)

A. pseudogeniculatum W. T. Wang in Fl. Reip. Pop. Sin. 27: 610. 1979; L. Q. Li & Kadota in Fl. China 6: 210. 2001, syn. nov. Type: China. Sichuan (四川): Danba (丹巴), 1972, Chengdu Med. Stat. (成都中药材站) s.n. (holotype, PE!).

A. franchetii Finet & Gagnep. var. *glabrescens* W. T. Wang in Bull. Bot. Lab. North-East Forest. Inst. 8 (8): 21. 1980; L. Q. Li & Kadota in Fl. China 6: 179. 2001, syn. nov. Type: China. Sichuan (四川): Meigu (美姑), 1979-08, Sichuan Med. Stat. (四川中药材站) s.n. (holotype, M).

A. pukeense var. *brevipes* W. T. Wang in Bull. Bot. Res. 3 (1): 26. 1983; L. Q. Li & Kadota in Fl. China 6: 177. 2001, syn. nov. Type: China. Sichuan (四川): Yuexi (越西), in forest, alt. 2800 m, 1973-07-13, Sichuan Econ. Pl. Exped. (四川经济植物调查队) 3921 (holotype, PE!)

A. shimianense W. T. Wang in Acta Bot. Yunnan. 6: 366, fig. 2: 1, 2. 1984; L. Q. Li & Kadota in Fl. China 6: 177. 2001, syn. nov. Type: China. Sichuan (四川): Shimian (石棉), in shrub on mountain slope, alt. 3500-3800 m, 1979-07-23, Shimian Division (石棉队) 78-818 (holotype, MS!; isotype, PE!).

A. coriaceifolium W. T. Wang in Acta Bot. Yunnan. 6: 367, fig. 3: 1-3. 1984; L. Q. Li & Kadota in Fl. China 6: 180. 2001, syn. nov. Type: China. Sichuan (四川): Jiulong (九龙), on rocky slope, alt. 2400 m, 1979-08-10, Q. Q. Wang (王清泉) 21462 (holotype, CDBI!;

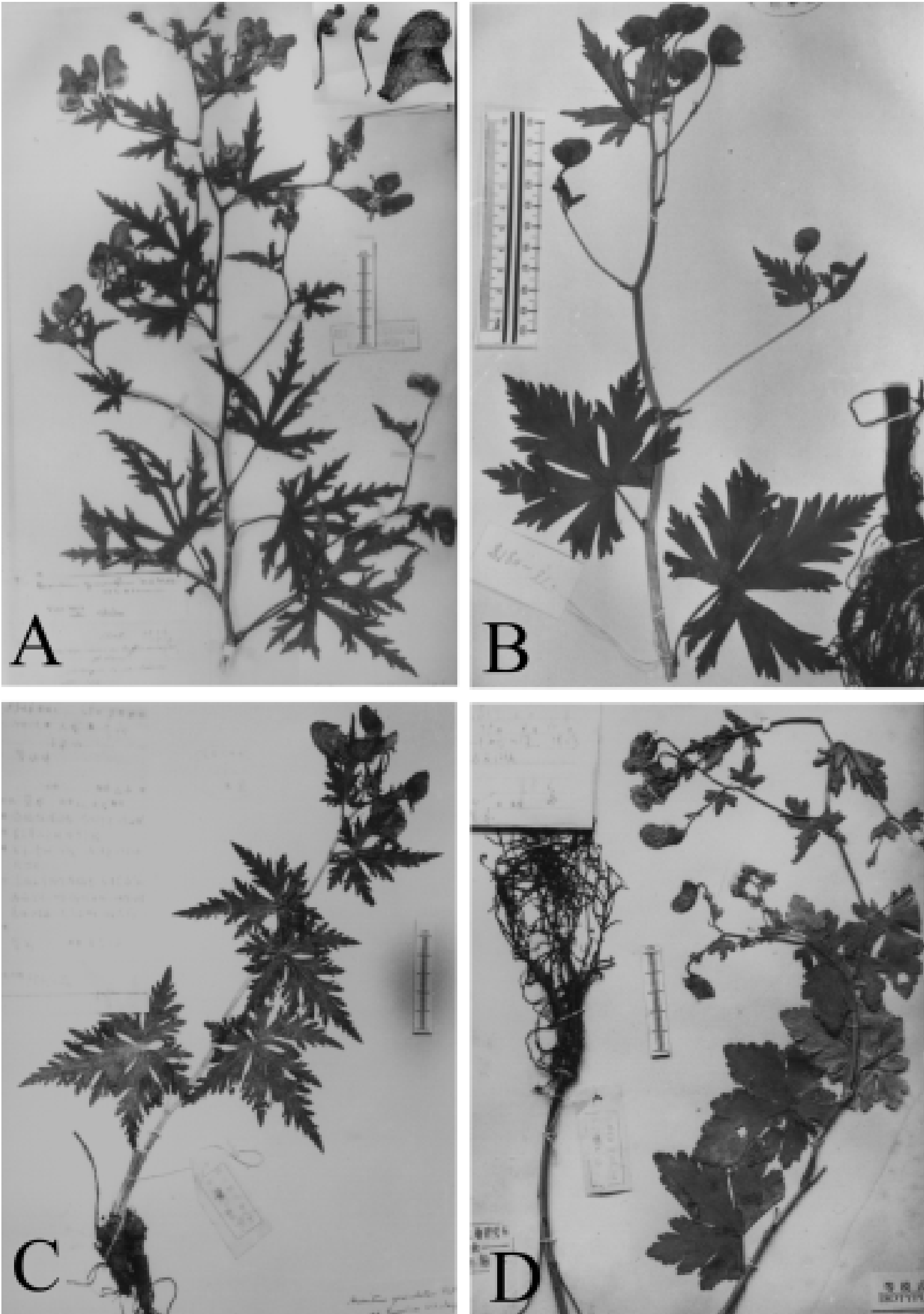


图10 膝瓣乌头 **A.** 云南东北部,Maire 1036 (E, 膝瓣乌头的副模式)。**B.** 四川石棉,石棉队78-818 (PE, *Aconitum shimianense*的等模式)。**C.** 四川九龙,九龙队326 (MS)。**D.** 四川九龙,王清泉21462 (CDBI, *A. coriaceifolium*的主模式)。
Fig. 10. *Aconitum geniculatum* Fletcher & Lauener. **A,** NE Yunnan, Maire 1036 (E, paratype). **B,** Shimian, Sichuan, Shimian Division 78-818 (PE, isotype of *A. shimianense* W. T. Wang). **C,** Jiulong, Sichuan, Jiulong Division 326 (MS). **D,** Jiulong, Sichuan, Q. Q. Wang 21462 (CDBI, holotype of *A. coriaceifolium* W. T. Wang).

isotypes, CDBI!, PE!).

A. luningense W. T. Wang in Acta Phytotax. Sin. 25: 24, pl. 1, fig. 2. 1987; L. Q. Li & Kadota in Fl. China 6: 176. 2001, syn. nov. Type: China. Sichuan (四川): Mianning (冕宁), in shrub, alt. 3050 m, 1983-09-06, Y. F. Liang (梁永福) 83-3 (holotype, PE!; isotype, MCH!).

多年生草本,高60-100 cm。整个植株无毛,茎下部直立,上部常披散或缠绕。叶片五角形,基部心形,三深裂至基部5-10 mm处,中央深裂片菱形,渐尖,三裂,两面无毛;叶柄长3-5 cm,无毛,基部常具鞘。花序总状或近伞房状,长3-8.5 cm,有2-8朵花,花腋生或顶生,腋生花梗长;轴和花梗均无毛;苞片叶状;花梗长2-4 cm;小苞片生花梗中部,线形,长圆形或披针形,无毛;萼片蓝色,外面无毛,上萼片高盔形,高1-1.6 cm,自基部至喙长1.2-1.5 cm,下缘直;花瓣无毛,通常爪在顶端膝状弯曲,距长约2.5 mm,向后弯曲;雄蕊无毛,花丝全缘或具2枚小齿;心皮5,无毛。花期7-8月。

分布:四川西南部,云南东北部。

Sichuan (四川): Butuo (布拖), P. Guo (郭平) 88-001, Liangshan Med. Pl. (凉山中草药) 783 (MS); Danba (丹巴), Sichuan Med. Stat. (四川中药材站) s.n; Jinyang (金阳), Sichuan Veg. Exped. (四川植被队) 14693 (PE, CDBI); Jiulong (九龙), Jiulong Division (九龙队) 326 (MS), Q. Q. Wang (王清泉) 21462 (PE, CDBI); Mianning (冕宁), Y. F. Liang et al. (梁永福等) 83-3 (PE, MCH); Puge (普格), Sichuan Med. Pl. Exped. (四川药源队) 25004 (MS, NAS), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 5476 (PE, KUN); Shimian (石棉), Shimian Division (石棉队) 78-818; Xichang (西昌), J. P. Zhang (张健平) 540 (CDBI); Yuexi (越西), Sichuan Veg. Exped. (四川植被队) 14095 (PE, CDBI), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 3921, M. Li (李鸣) 007 (M), Liangshan Med. Pl. (凉山中草药) 806 (MS). **Yunnan** (云南): Dongchuan (东川), C. R. Yang (杨崇仁) s.n., S. B. Lan (蓝顺彬) 212, 548; Huize (会泽), Maire 259 (E), NE Yunnan Division (滇东北队) 326 (KUN), Dongchuan Division (东川队) 63-185 (KUN), Y. Q. Liu (刘玉清) s.n. (KUN); Luquan (禄劝), Y. P. Chang (张英伯) 675 (KUN), P. I. Mao (毛品一) 1055, 926 (PE, KUN), Q. E. Yang (杨亲二) 9102; NE Yunnan (滇东北), without precise locality, Maire 1036 (E); Qiaojia (巧家), K. X. Yang (杨康玺) 7834.

本种在四川凉山州和云南东北部乌蒙山地区是较常见的一个种,通常具有腋生和顶生的花序,在林下分布时,上部通常披散,具有藤本的体态。它的显著特征是花梗无毛或近无毛。叶的分裂程度存在很大的变化,通常不分裂到基部,仅深裂至距基部5-10 mm处,在Maire采的标本(Maire 1036)(图10:A)和采自丹巴的标本(成都中药材站s.n.),叶的分裂程度较大。其叶的一回裂片浅裂至细裂,分裂程度变化较大,在我们查看的标本中,叶裂片有的较宽(图10:B,D),有的细裂(图10:A,C)。另外它的小苞片形状变异也较大,披针形或叶状、椭圆形、倒卵形或长圆形等。Fletcher和Lauener发表本种时,强调它的花瓣膝状弯曲,但是我们认为花瓣的形状并非是很稳定的特征,并且在膝瓣乌头中该性状也存在变异,即使在同一种中,花瓣的形状有时膝状弯曲,有时不膝状弯曲。

产于四川普格的低盔膝瓣乌头*A. geniculatum* var. *humilius* W. T. Wang和采自禄劝的爪盔膝瓣乌头var. *unguiculatum* W. T. Wang的区别性状属于正常变异范围之内,不应分出。

普格乌头*A. pukeense* W. T. Wang经杨亲二(1999)研究已经降为异名,其分布区与本种是重叠的,且重要的形态特征完全相同而不可分。王文采发表的短梗普格乌头*A. pukeense* var. *brevipes* W. T. Wang的模式标本花很少,且为一年生或发育不良的植株,因为其花梗无毛所以也将它处理为本种的异名。

石棉乌头*A. shimianense*(图10:B)在发表时,作者(王文采, 1984)将其与普格乌头*A. pukeense*(=*A. geniculatum*,见杨亲二(1999))比较。他认为石棉乌头的花梗疏被短绒毛,花瓣不膝状弯曲而与普格乌头相区别。我们查看了模式标本,花梗几乎无毛,体态与膝瓣乌头完全相似,叶的分裂程度和上萼片的形态等特征与膝瓣乌头也是吻合的,该植物应是大凉山一带常见的膝瓣乌头。

王文采(1984)发表革叶乌头*A. coriaceifolium*(图10:D)时,认为它的叶为革质而比较特殊,但其叶形、花的构造和花梗毛被等特征都与膝瓣乌头相似,没有本质区别,故应归并。

芦宁乌头*A. luningense*产冕宁芦宁。体态为藤状草本,叶深裂,茎上疏被开展毛,花梗无毛,上萼片应为高盔形,但因有折叠而似盔形。我们还查看了存于重庆药品检验所(MCH)的同号模式标本,标本无花,叶形与本种没有区别。因此芦宁乌头也不成立,应予归并。

14. 大渡乌头

Aconitum franchetii Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 510, pl. 9. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 107. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 209, pl. 43, figs. 6-8; pl. 45, fig. 3. 1979; L. Q. Li & Kadota in Fl. China 6: 178. 2001. Type: China. Sichuan (四川): Baoxing (宝兴), 1869-08, David s.n. (syntype, P); Kangding (康定), 1893-08, Soulié 2031 (syntype, P!).

A. phyllostegium Hand.-Mazz. var. *pilosum* Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 183. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 223. 1979; L. Q. Li & Kadota in Fl. China 6: 184. 2001, syn. nov. Type: China. Sichuan (四川): Muli (木里), alt. 4600 m, 1929-09, Rock 18289 (holotype, E!; isotype, GH!).

A. franchetii var. *subnaviculare* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 67, pl. 5, fig. 17. 1965; et in Fl. Reip. Pop. Sin. 27: 211. 1979; L. Q. Li & Kadota in Fl. China 6: 179. 2001, syn. nov. Type: China. Sichuan (四川): Lushan (芦山), alt. 3400 m, 1958-07, L. Liou (刘亮) 103 (holotype, PE!).

A. franchetii var. *geniculatum* W. T. Wang in Bull. Bot. Lab. North-East Forest. Inst. 8 (8): 21. 1980; L. Q. Li & Kadota in Fl. China 6: 179. 2001, syn. nov. Type: China. Sichuan (四川): Baoxing (宝兴), 1979-08, Sichuan Med. Stat. (四川中药材站) s.n. (holotype, M; isotype, PE!).

A. franchetii var. *lasiocalyx* W. T. Wang & Hsiao in Acta Bot. Yunnan. 4: 129. 1982; L. Q. Li & Kadota in Fl. China 6: 179. 2001, syn. nov. Type: China. Sichuan (四川): Yanbian (盐边), alt. 4100 m, 1979-06-02, Yanbian Division (盐边队) 713 (holotype, M!; isotype, PE!).

A. sinonapelloides W. T. Wang var. *subulatum* W. T. Wang in Acta Bot. Yunnan. 4: 133, pl. 1, fig. 3. 1982; L. Q. Li & Kadota in Fl. China 6: 213. 2001, syn. nov. Type: China. Sichuan (四川): Muli (木里), alt. 3000 m, 1978-09-08, Muli Division (木里队) 643 (holotype, M!;

isotype, MS!).

A. magnibracteolatum W. T. Wang in Acta Bot. Yunnan. 6: 364, fig. 1: 1-3. 1984; L. Q. Li & Kadota in Fl. China 6: 176. 2001, syn. nov. Type: China. Sichuan (四川): Yanbian (盐边), alt. 4100 m, 1979-06-02, Yanbian Division (盐边队) 713 (holotype, MS!; isotype, PE!).

A. lobulatum W. T. Wang in Acta Bot. Yunnan. 6: 369, fig. 3: 4-6. 1984; L. Q. Li & Kadota in Fl. China 6: 184. 2001, syn. nov. Type: China. Sichuan (四川): Muli (木里), in alpine meadows, 1978-09-16, Muli Division (木里队) 710 (holotype, MS!; isotype, PE!).

A. pseudogeniculatum W. T. Wang var. *pubipes* W. T. Wang in Acta Bot. Yunnan. 6: 372. 1984; L. Q. Li & Kadota in Fl. China 6: 210. 2001, syn. nov. Type: China. Sichuan (四川): Meigu (美姑), in moist place on mountain slope, alt. 2700-3500 m, 1979-07-17, B. S. Zeng & T. G. Pan (曾本松,潘太国) 14 (holotype, PE!).

A. yanyuanense W. T. Wang in Acta Phytotax. Sin. 25: 28, pl. 2, fig. 2. 1987; L. Q. Li & Kadota in Fl. China 6: 189. 2001, syn. nov. Type: China. Sichuan (四川): Yanyuan (盐源), in moist place under *Abies* woods, alt. 3600-3700 m, 1983-08-08, L. H. Liu (刘伦辉) s.n. (holotype, PE!).

A. tatsienense auct. non Finet & Gagnep.: Hand.-Mazz., Symb. Sin. 7: 285. 1931.

A. transsectum auct. non Diels: W. T. Wang in Acta Bot. Yunnan. 6: 369. 1984; L. Q. Li & Kadota in Fl. China 6: 187. 2001, p.p., quoad Pl. Sichuan.

多年生草本,高50-120 cm。块根胡萝卜形。茎疏被反曲而紧贴的短柔毛。茎下部叶有长柄,在开花时枯萎。茎中部叶有稍长柄;叶片心状五角形,长约7.5 cm,宽约8.5 cm,三深裂至距基部5-12 mm处,中央深裂片菱形,几无毛或疏被短柔毛;叶柄疏被反曲的短柔毛,几无鞘。顶生总状花序长10-35 cm,有7-20朵花,花序轴下部常有腋生的花序,花较少;轴和花梗被反曲的短柔毛,或被开展的柔毛;中部以下的苞片叶状,具短柄,上部苞片小,线形;下部花梗较长,长1-10 cm;小苞片生花梗中部,下部花梗的小苞片常很大,叶状三裂,其他小苞片长圆形至线形;萼片蓝紫色,外面无毛或疏被短柔毛,上萼片盔形,高1.8-2.4 cm,自基部至喙长1.9-2.3 cm,下缘通常近直或稍凹;花瓣无毛,距长约2.5 mm,向后弯或拳卷,有时爪在顶端膝状弯曲;雄蕊无毛,花丝全缘或有2枚小齿;心皮3或5,无毛或被白色短柔毛。花期7-9月。

分布:四川西部和西南部。

14a. 大渡乌头　原变种　图11

var. **franchetii**

本变种的花序轴和花梗被反曲的短柔毛。

分布:四川西部和西南部。

Sichuan (四川): Baoxing (宝兴), Wilson 1995, 2000, 2000a (K), K. C. Kuan & W. T. Wang (关克俭,王文采) 2919, S. Y. Hu (胡秀英) 1396, 1398 (SZ), Sichuan Med. Stat. (四川中药材站) s.n. (PE, M); Kangding (康定), Soulié 2031 (P), 499 (P, K), Wilson 4525 (K), K. C. Kuan & W. T. Wang (关克俭,王文采) 580, H. L. Tsiang (蒋兴麟) 36659 (PE, SZ); Luding (泸定), C. H. Chen et al. (陈朝惠等) 20, Sichuan Veg. Exped. (四川植被队) 31343, 41534 (CDBI), Anonymous 27-3 (M); Lushan (芦山), L. Liou (刘亮) 103, 125; Mao Xian (茂县),

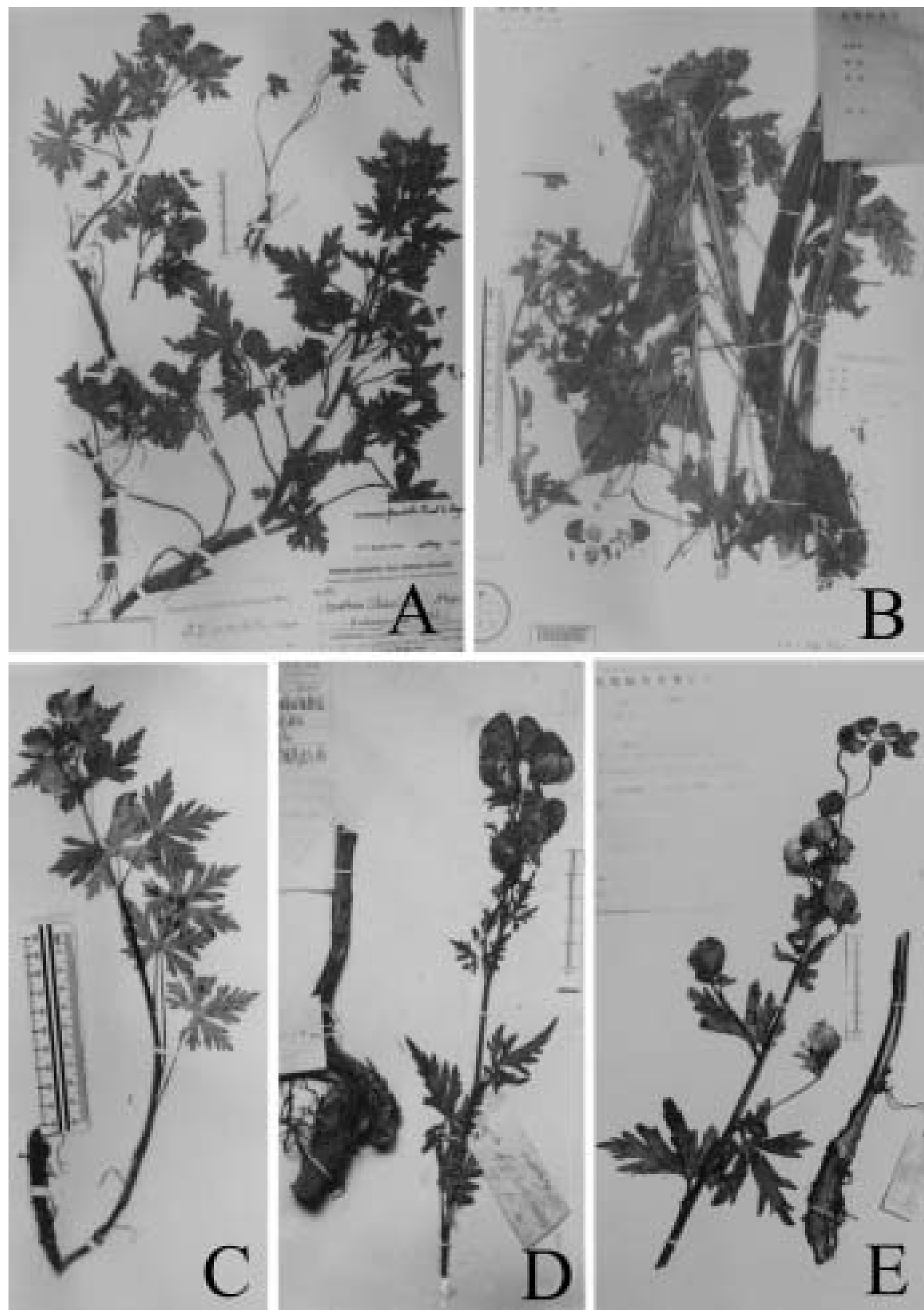


图**11** 大渡乌头(原变种) **A.** 四川木里, Smith 7313 (WU, *Aconitum phyllostegium* var. *pilosum* Fletcher & Lauener同号副模式)。**B.** 四川盐源,刘伦辉无号(PE, *A. yanyuanense* W. T. Wang的主模式)。**C.** 四川木里, Rock 18289 (E, *A. phyllostegium* var. *pilosum*的主模式)。**D.** 四川木里,木里队710 (MS, *A. lobulatum* W. T. Wang的主模式)。**E.** 四川盐边,盐边队713 (MS, *A. franchetii* var. *lasiocalyx* W. T. Wang & Hsiao的等模式; *A. magnibracteolatum* W. T. Wang的主模式)。
Fig. 11. *Aconitum franchetii* Finet & Gagnep. var. *franchetii* **A,** Muli, Sichuan, Smith 7313 (WU, isoparatype of *A. phyllostegium* var. *pilosum* Fletcher & Lauener). **B,** Yanyuan, Sichuan, L. H. Liu s.n. (PE, holotype of *A. yanyuanense* W. T. Wang). **C,** Muli, Sichuan, Rock 18289 (E, holotype of *A. phyllostegium* var. *pilosum*). **D,** Muli, Sichuan, Muli Division 710 (MS, holotype of *A. lobulatum* W. T. Wang). **E,** Yanbian, Sichuan, Yanbian Division 713 (MS, isotype of *A. franchetii* var. *lasiocalyx* W. T. Wang & Hsiao; holotype of *A. magnibracteolatum* W. T. Wang).

Sichuan Med. Inst. (四川中药研究所) 5960 (MS), Aba Inst. Drug Control (阿坝州药检所) s.n. (MS); Meigu (美姑), B. S. Zeng & T. G. Pan (曾本松,潘太国) 14; Muli (木里), Muli Division (木里队) 643 (M, MS), Muli Division (木里队) 710 (PE, MS), Rock 18289 (E, GH), Smith 7313 (WU, E); Xiaojin (小金), S. S. Chang et al. (张秀实等) 5830, T. T. Yu (俞德浚) 4442 (NAS), Y. Luo & Y. B. Luo (罗艳,罗毅波) 390, 392, 398; Yanbian (盐边), Yanbian Division (盐边队) 713 (PE, M, MS, LSDC); Yanyuan (盐源), Yanyuan Division (盐源队) 544 (MS), L. H. Liu (刘伦辉) s.n.; Without precise locality, Legendre 1574 (P), Limprichit 2375 (WU).

本种是Finet和Gagnepain根据两份标本David s.n.和Soulié 2031建立的,我们只看到了Soulié 2031。Fletcher和Lauener(1950)曾研究过这两份标本,他们同意这两份标本为同一种,二者花序轴和花梗都被有白色的短贴伏毛,花瓣膝状弯曲,只是上萼片的形状不同,David s.n.为半球形,Soulié 2031上萼片有些伸长。上萼片的形状和花瓣在该变种中存在一定的变异,因此王文采根据萼片的高低和花瓣的形态划分的低盔大渡乌头*A. franchetii* var. *subnaviculare*以及膝瓣大渡乌头*A. franchetii* var. *geniculatum*都不应成立。

毛萼变种*A. franchetii* var. *lasiocalyx*与巨苞乌头*A. magnibracteolatum*的模式实为同一号标本(图11: E),采自盐边,花序梗稍被绒毛,小苞片叶状,萼片外面被毛,都应该属于本种。其他一些分布于四川西部的类群,如伏毛木里乌头*A. phyllostegium* var. *pilosum*(图11: A, C)、钻苞拟缺刻乌头*A. sinonapelloides* var. *subulatum*、浅裂乌头 *A. lobulatum*(图11: D)、黄毛梗乌头*A. pseudogeniculatum* var. *pubipes*和盐源乌头*A. yanyuanense*(图11: B)彼此在体态、叶形、花梗毛被以及花的形态构造等方面都很相近,仅有一些微小的差别,如小苞片的形态、子房被毛等,不足以将它们分开建立新分类群,因此这些名称都应予归并。

14b. 展毛大渡乌头 变种

var. **villosulum** W. T. Wang in Fl. Reip. Pop. Sin. 27: 211. 1979; L. Q. Li & Kadota in Fl. China 6: 179. 2001; Y. Luo & Q. E. Yang in Acta Phytotax. Sin. 40: 473. 2002. Type: China. Sichuan (四川): Without precise locality, W Sichuan, C. L. Wu (吴中伦) 12405 (holotype, NAS!; isotype, NAS!).

A. wolongense auct. non W. T. Wang: W. T. Wang in Bull. Bot. Res. 9 (2): 1, fig. 1: 1. 1989, p.p., the upper specimen on the mixed sheet.

与原变种的区别在于花序轴和花梗有开展的柔毛。

分布:四川西部。

Sichuan (四川): Wenchuan (汶川), K. Y. Lang et al. (郎楷永等) 1209; Xiaojin (小金), Y. Luo & Y. B. Luo (罗艳,罗毅波) 395; Without precise locality, C. L. Wu (吴中伦) 12405 (NAS).

15. 康定乌头 图12

Aconitum tatsienense Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 510, pl. 9, A. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 105. 1939; Icon. Corm. Sin. 1: 690, fig. 1379. 1972; W. T. Wang in Fl. Reip. Pop. Sin. 27: 216, pl. 43, figs. 1, 2; pl. 45, fig. 6. 1979; L. Q. Li & Kadota in Fl. China 6: 181. 2001. Type: China. Sichuan (四川): Kangding (康定), 1893-08-13, Soulié

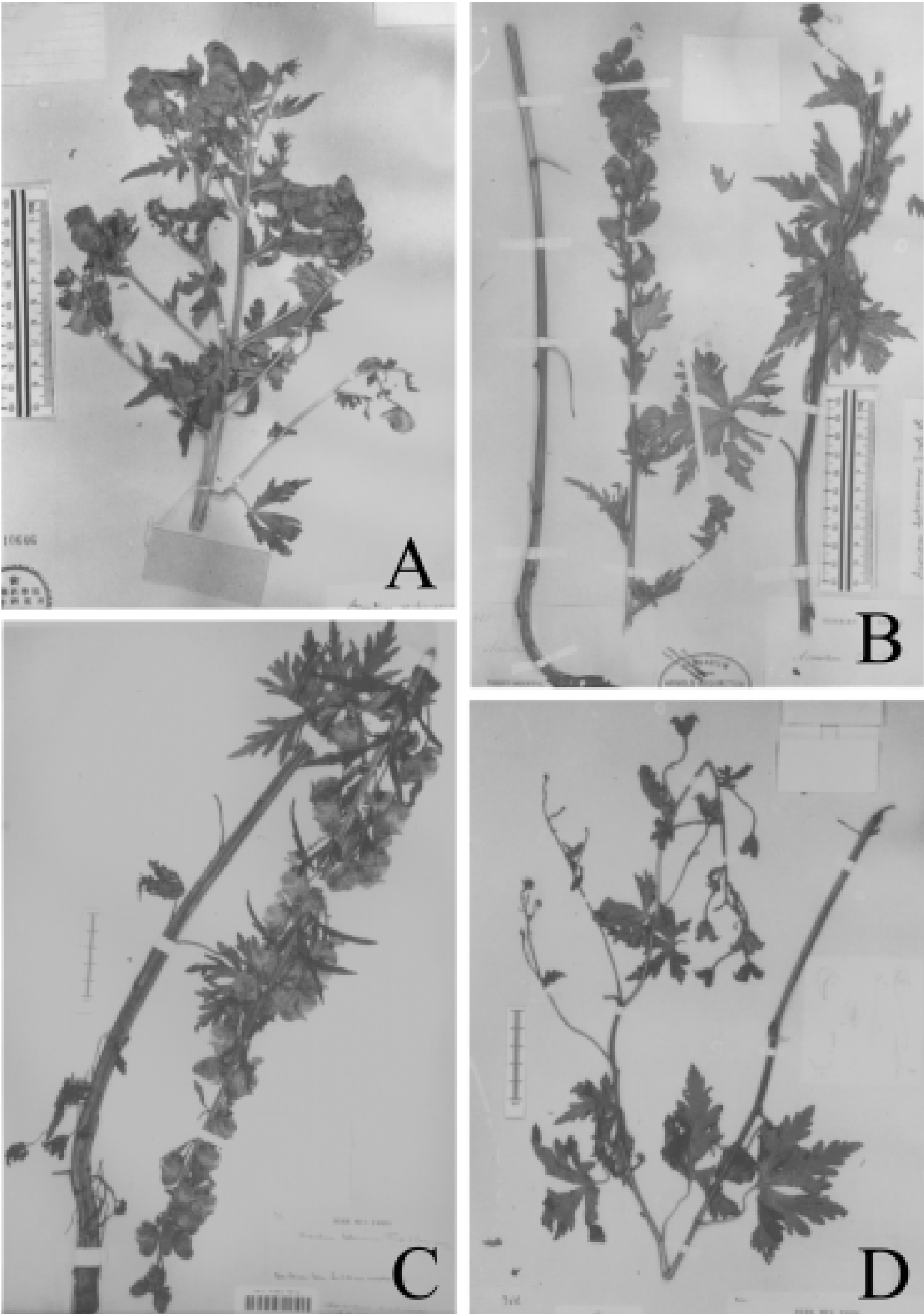


图12　康定乌头　**A.** 四川雅江,应俊生 3298 (PE, *Aconitum yachiangense* W. T. Wang的主模式)。**B.** 四川康定, Soulié 425 (P, 后选模式)。**C.** 四川康定, Mussot 20 (P)。**D.** 四川康定, Soulié 360 (P, *A. divaricatum* Finet & Gagnep.的主模式)。
Fig. 12. *Aconitum tatsienense* Finet & Gagnep. **A,** Yajiang, Sichuan, J. S. Ying 3298 (PE, holotype of *A. yachiangense* W. T. Wang). **B,** Kangding, Sichuan, Soulié 425 (P, lectotype). **C,** Kangding, Sichuan, Mussot 20 (P). **D,** Sichuan, Kangding, Soulié 360 (P, holotype of *A. divaricatum* Finet & Gagnep.).

425 (lectotype, here designated, P!; isolectotype, PE!).

A. sikangense Hand.-Mazz. in Acta Hort. Gotob. 13: 105. 1939. Type: China. Sichuan (四川): Dawu (道孚), in meadows, alt. 3700 m, 1934-09-01, H. Smith 11805 (holotype, W; isotype, PE!).

A. divaricatum Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 511, pl. 8, A. 1904. Hand.-Mazz. in Acta Hort. Gotob. 13: 105. 1939, p.p., ex Pl. Yunnan.——*A. tatsienense* var. *divaricatum* (Finet & Gagnep.) W. T. Wang in Fl. Reip. Pop. Sin. 27: 216. 1979; L. Q. Li & Kadota in Fl. China 6: 182. 2001, syn. nov. Type: China. Sichuan (四川): Kangding (康定), 1891-08, Soulié 360 (holotype, P!).

A. yachiangense W. T. Wang in Fl. Reip. Pop. Sin. 27: 605, pl. 41, figs. 3, 4. 1979; L. Q. Li & Kadota in Fl. China 6: 178. 2001, syn. nov. Type: China. Sichuan (四川): Yajiang (雅江), alt. 3100-3450 m, 1960-05-05, J. S. Ying (应俊生) 3298 (holotype, PE!; isotype, KUN!).

多年生草本,高60-170 cm。块根胡萝卜形。茎下部通常无毛,上部稍被短柔毛,有时有较多分枝。茎下部叶在开花时枯萎。茎中部叶具稍长柄或短柄;叶片五角形,长4.2-7 cm,宽6-8 cm,三深裂至距基部3-6 mm,中央深裂片菱形,表面被紧贴的短柔毛,背面只沿叶脉疏被短柔毛;叶柄比叶片短或近等长。顶生总状花序长8-40 cm,有7-30朵花;花序轴和花梗密被伸展的短柔毛;下部苞片叶状,上部苞片小,线形;花梗长1.5-4 cm;小苞片生花梗下部,线形或线状钻形;萼片淡蓝色或白色,稀蓝紫色,外面疏被短柔毛或无毛,上萼片盔形,高1.7-2 cm,自基部至喙长1.5-1.8 cm,下缘向上斜展,与外缘形成短或长喙;花瓣密被短柔毛,爪部有时膝状弯曲,距稍向后弯曲;花丝被短毛,全缘;心皮3-5,无毛或被短柔毛。花期7-9月。

分布:四川康定、道孚一带。

Sichuan (四川): Dawu (道孚), Smith 11805, Anonymous 189 (SZ); Kangding (康定), Soulié 425, 360 (P), Mussot 20 (P), Smith 10813, 12785, Cunningham 211, 231 (E), Wilson 3108 (K), K. C. Kuan & W. T. Wang (关克俭,王文采) 448, 1253, H. L. Tsiang (蒋兴麟) 36932, 36679, 36475 (SZ), C. S. Liu (刘振书) 1273, 1274 (SZ), J. P. Peng & X. A. Li (彭锦屏,李孝安) 6, W. P. Fang (方文培) 3646 (PE, NAS), W. G. Hu (胡文光), Z. He (何铸) 11098, 11128, 11034, Z. G. Liu (刘照光) 29739 (PE, CDBI), H. C. Chow (周鹤昌) 662, Y. Luo & Y. B. Luo (罗艳,罗毅波) 381, 382; Luding (泸定), Sichuan Veg. Exped. (四川植被队) 31700 (CDBI); Yajiang (雅江), J. S. Ying (应俊生) 3298 (PE, KUN)。

本种叶形与膝瓣乌头和大渡乌头相似,通常不裂到基部,但花序轴及花序梗被开展毛,花较后二者小,上萼片窄,为盔形,具较明显的喙,子房多少被毛,花瓣密被毛,爪部有时膝状弯曲。Finet和Gagnepain(1904)共引了2份采自康定的标本,即Soulié 425(图12:B)和Mussot 20(图12:C),我们在此指定前者为本种的后选模式。展枝康定乌头*A. tatsienense* var. *divaricatum* (Finet & Gagnep.) W. T. Wang(图12:D)与原变种康定乌头的区别就在于茎中部以上有较多较长的分枝。我们在野外观察到,乌头属植物上部分枝的情况在显柱乌头系和兴安乌头系中是较为普遍的,因此我们认为茎上分枝的有无及其长短一般不能作为分类的依据,因此将展枝康定乌头合并。

16. 侧花乌头

Aconitum secundiflorum W. T. Wang in Bull. Bot. Research 3 (1): 24. 1983; L. Q. Li & Kadota in Fl. China 6: 179. 2001. Type: China. Sichuan (四川): Mao Xian (茂县), on the mountain slope, alt. 2850 m, 1975-08-16, Chengdu Inst. Biol. Exped. (成都生物所调查队) 11031 (holotype, PE!; isotype, CDBI!).

多年生草本,高32-42 cm。茎光滑无毛,中部之上有短分枝。茎下部叶具长柄,在开花时枯萎,上部叶具短柄;叶片草质,五角形,长4.8-5.5 cm,宽4.8-6.4 cm,三深裂至距基部5-6 mm处,中央深裂片菱形,二回裂片缺刻状浅裂,表面疏被短柔毛,背面无毛或近无毛;叶柄长1.5-5 cm,疏被短柔毛,基部具短而狭的鞘。顶生总状花序长6.5-10 cm,花少,3-5朵花,花偏向一侧;下部苞片叶状,有时具短柄;轴和花梗被开展的短柔毛;花梗长1-4 cm;小苞片与花邻接,叶状或狭椭圆形。萼片蓝色,外面被短柔毛,上萼片盔形,高1.4-1.6 cm,下缘稍凹,与外缘形成短喙,尖锐;花瓣疏被柔毛,距长约1.2 mm,向内弯;花丝疏被柔毛,全缘;心皮3-5,子房疏被短柔毛。花期8-9月。

分布:四川茂县。

Sichuan (四川): Mao Xian (茂县), Chengdu Inst. Biol. Exped. (成都生物所调查队) 11031 (PE, CDBI).

17. 木里乌头

Aconitum phyllostegium Hand.-Mazz. in Acta Hort. Gotob. 13: 110. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 203. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 222. 1979; L. Q. Li & Kadota in Fl. China 6: 184. 2001. Type: China. Sichuan (四川): Muli (木里), alt. 3960-4270 m, 1922-06, Forrest 21419 (holotype, E!).

A. souliei Finet & Gagnep. var. *glabrum* Comber in Not. Bot. Gard. Edinb. 18: 225. 1934, p.p. quoad typum tantum. Type: China. Sichuan (四川): Muli (木里), alt. 3960-4270 m, 1922-06, Forrest 21419 (holotype, E!).

多年生草本,高约30 cm。块根胡萝卜形。茎被开展的黄色微柔毛,下部无叶,上部密生叶,下部的叶具长柄,与上部叶形成伞状,不分枝或具短分枝。叶片五角形,宽4-5 cm,基部心形,三深裂至距基部3-4 mm处,中央深裂片菱形浅裂,急尖,表面被短柔毛;最下部叶柄长达15 cm,中部长约7 cm,基部有狭鞘。花序长8-14 cm,有4-7朵花;苞片叶状,有时具柄;最下部的花梗长达5 cm,上部的长1.5 cm;小苞片与花邻接,叶状,有短柄;萼片淡黄色,外面稍绿,内面及边缘被长硬毛,上萼片盔状船形,高1.2-1.8 cm,具短喙,下缘弧形或稍凹;花瓣无毛,爪顶端膝状弯曲,距长约1.2 mm,向后弯曲;雄蕊无毛,花丝全缘;心皮5,无毛。花期6月。

分布:四川木里。

Sichuan (四川): Muli (木里), Forrest 21419 (E), Y. Chen 307 (NAS).

本种只根据一份采自四川木里的标本Forrest 21419描述,仅在江苏植物研究所(NAS)发现有两份标本与其近似。本种在体态、叶形和花形态上与上一种侧花乌头都很相似,只是二者的地理分布有隔离。从叶形和花梗毛被来看,它们与康定乌头关系近缘,由于缺乏标本和野外调查,因此暂时仍将它们做为独立的种处理。

18. 拟显柱乌头

Aconitum stylosoides W. T. Wang in Fl. Reip. Pop. Sin. 27: 606. 1979; et in l.c. 27: 214, pl. 41, figs. 1, 2. 1979; L. Q. Li & Kadota in Fl. China 6: 181. 2001. Type: China. Sichuan (四川): Daocheng (稻城), at the edge of *Picea* woods, alt. 3500 m, 1973-08-20, Sichuan Veg. Exped. (四川植被队) 2586 (holotype, PE!; isotypes, CDBI!, KUN!).

多年生草本,高约1 m。块根胡萝卜形或纺锤形。茎被反曲或稍开展的短柔毛。茎中部叶有短柄;叶片草质,心状五角形,长约9 cm,宽约12 cm,三深裂至距基部5 mm处,中央深裂片菱形,浅裂,表面疏被短伏毛,背面近无毛;叶柄长约3 cm。顶生总状花序长约20 cm,有5-8朵花;轴和花梗有开展的短毛和腺毛;苞片叶状;花梗长2-5 cm;小苞片生花梗中部或上部,狭线形;萼片蓝紫色,外面被有短柔毛,上萼片船形,较宽,高1-1.5 cm,自基部至喙长2.5-2.7 cm;花瓣有柔毛,距长约2 mm,向后下方弯曲;花丝全缘,有短毛;心皮3-4,子房被毛。花期8月。

分布:四川稻城。

Sichuan (四川): Daocheng (稻城), Sichuan Veg. Exped. (四川植被队) 2586 (PE, CDBI, KUN), 322, 2466, 4332 (CDBI).

本种与分布于云南西北部和西藏东南部的显柱乌头*A. stylosum* Stapf相近,但上萼片的形状有区别,后者上萼片盔形或船状盔形。

系**6.** 岩乌头系

Ser. 6. **Racemulosa** W. T. Wang in Acta Phytotax. Sin. Addit. 1: 75. 1965; et in Fl. Reip. Pop. Sin. 27: 232. 1979.

块根2。茎直立或外倾。基生叶不存在;叶片革质,不分裂或掌状深裂,一回裂片不分裂。上萼片近圆筒形或高盔形。花瓣有短距。种子有横膜翅。

19. 岩乌头

Aconitum racemulosum Franch. in Morot, Journ. Bot. 8: 276. 1894; Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 501. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 131. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 204. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 232. 1979; Icon. Corm. Sin. 1: 690, fig. 1380. 1972; L. Q. Li & Kadota in Fl. China 6: 189. 2001. Type: China. Guizhou (贵州): Without precise locality, Perny s.n. (holotype).

A. coriaceum Lévl. in Rep. Sp. Nov. 2: 257. 1904. Type: China. Guizhou (贵州): Majo, 1907, Cavalerie 3034 (holotype, E!)

A. sczukinii Turcz. var. *pauciflorum* Rapaics in Növ. Közl. 6: 161. 1907. Type: China. Chongqing (重庆): Nanchuan (南川), Rosthorn s.n. (holotype).

A. racemulosum var. *pengzhouense* W. J. Zhang & G. H. Chen in Acta Phytotax. Sin. 39: 87, fig. 1. 2001, syn. nov. Type: China. Sichuan (四川): Pengzhou (彭州), alt. 2500 m, 1998-09-23, X. D. Zhang (张晓东) 98-9-3 (holotype, PE!; isotype, in Herbarium of School of Pharmacy, West China University of Medical Sciences (WCU)).

多年生草本,常生长于山谷岩石上。块根倒圆锥形或近圆柱形,较小。茎通常匍匐或悬挂在岩石上,长20-65 cm,无毛。茎上部叶叶柄近等长;叶片革质,五角形,有时圆菱形,长5.5-9 cm,宽6-10 cm,基部心形或浅心形,有时圆形,三深裂至距基部1.5-3 cm处,中央深裂

片卵状菱形,长渐尖,通常不分裂,边缘有圆钝齿,叶两面光滑无毛;叶柄长2.2-3 cm,无毛。花序总状,有时有分枝,有1-6朵花,长2.2-3 cm;轴和花梗无毛或疏被开展毛;花梗长约1 cm;小苞片生于花梗中部或上部,披针形或披针状线形,或较大,卵形、宽卵形或菱形;萼片紫红色或蓝紫色,上萼片圆筒状高盔形或盔形,高2.4-3.2 cm,中部稍缢缩,下缘稍凹,长1.5-2.4 cm;花瓣无毛,距长5-7 mm,向后弯曲;雄蕊无毛,花丝有2枚小齿或全缘;心皮3,无毛或被白色柔毛。花期8-10月。

分布:四川中部、西部,重庆,云南东北部和贵州。

19a. 岩乌头 原变种

var. **racemulosum**

本变种的小苞片较小,披针形或披针状线形。

分布:四川中部,重庆,云南东北部和贵州。

Chongqing (重庆): Nanchuan (南川), S. X. Tan & D. Z. Fu (谭士贤,傅德志) 83204, Mt. Jinfoshan Exped. (金佛山考察队) 1121, G. F. Li (李国凤) 64531, J. H. Xiong & Z. L. Zhou (熊济华,周子林) 92897; Wulong (武隆), Fuling Med. Pl. (涪陵地区中草药) 639 (MS); Youyang (酉阳), S. X. Tan (谭士贤) 359. **Guizhou** (贵州): Without precise locality, Cavalerie 3034 (E). **Sichuan** (四川): An Xian (安县), An Xian Division (安县队) 98 (MS), X. D. Zhang (张晓东) 98-8-2; Baoxing (宝兴), Baoxing Division (宝兴队) 78-0136 (MS); Beichuan (北川), Beichuan Division (北川队) 655 (MS); Ganluo (甘洛), Xichang Inst. Drug Control (西昌药检所) 963 (MS); Luding (泸定), H. L. Tsiang (蒋兴麟) 35480; Lushan (芦山), Lushan Division (芦山队) 78-928 (MS); Mao Xian (茂县), Maowen Division (茂汶组) 5146 (MS), Y. Luo & Y. B. Luo (罗艳,罗毅波) 300; Mianzhu (绵竹), Mianzhu Division (绵竹队) 540 (MS); Mt. Emeishan (峨眉山), Y. B. Yang (杨亚滨) 299 (CDBI); Pengzhou (彭州), X. D. Zhang (张晓东) 98-9-3, 98-9-5; Wenchuan (汶川), Y. Luo & Y. B. Luo (罗艳,罗毅波) 404. **Yunnan** (云南): Zhenxiong (镇雄), P. H. Yu (禹平华) 1115.

19b. 巨苞岩乌头 变种

var. **grandibracteolatum** W. T. Wang in Acta Phytotax. Sin. Addit. 1: 75. 1965; et in Fl. Reip. Pop. Sin. 27: 233, pl. 47, figs. 1-4; pl. 51, fig. 1. 1979; L. Q. Li & Kadota in Fl. China 6: 190. 2001. Type: China. Sichuan (四川): Mt. Emeishan (峨眉山), alt. 2350-2400 m, 1957-09-26, G. H. Yang (杨光辉) 57410 (holotype, PE!).

与原变种的区别在于小苞片较大,卵形、宽卵形或菱形。

分布:四川峨眉山和天全二郎山一带。

Sichuan (四川): Mt. Emeishan (峨眉山), G. H. Yang (杨光辉) 57410, 57459; Tianquan (天全), W. G. Hu & Z. He (胡文光,何铸) 11632, 11651, K. C. Kuan & W. T. Wang (关克俭,王文采) 2061A, H. L. Tsiang & J. H. Xiong (蒋兴麟,熊济华) 35600, W. G. Hu (胡文光) 35480, T. H. Tu (杜大华) 4679; Without precise locality, J. Tang (唐进) 64a.

20. 菱叶乌头

Aconitum rhombifolium Chen in Bull. Fan Mem. Inst. Biol., n.s., 1: 91. 1943; W. T. Wang in Fl. Reip. Pop. Sin. 27: 233, pl. 47, figs. 5, 6. 1979; L. Q. Li & Kadota in Fl. China 6:

190. 2001. Type: China. Chongqing (重庆): Ba Xian (巴县), Chien 13137 (holotype, PE!).

A. rhombifolium var. *leiocarpum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 76. 1965; et in Fl. Reip. Pop. Sin. 27: 235. 1979; L. Q. Li & Kadota in Fl. China 6: 190. 2001, syn. nov. Type: China. Sichuan (四川): Tianquan (天全), alt. 900 m, 1936-10-08, K. L. Chu (曲桂龄) 3981 (holotype, PE!).

多年生草本,常生长于山谷岩石上。块根倒圆锥形或近圆柱形,较小。茎通常匍匐或悬挂在岩石上,长可达70 cm,无毛。茎上部叶叶柄近等长;叶片革质,菱状卵形,不分裂,长8.5-15.5 cm,宽3.3-7 cm,顶端长渐尖,有时近尾状,基部宽楔形,边缘生粗锯齿;叶柄长1.4-3 cm。花序腋生或顶生,长2-3.5 cm,有1-3朵花;轴和花梗无毛或疏生伸展的短柔毛;苞片长圆形或钻形;花梗长约1 cm;小苞片生于花梗中部或中部以下;萼片蓝紫色,外面疏生短柔毛,上萼片圆筒状盔形,高约2.5 cm,中部缢缩,下缘稍凹,长1.1-1.5 cm;花瓣无毛,距长约5 mm,向后弯曲;雄蕊无毛,花丝有2枚小齿或全缘;心皮3,子房无毛或被稍开展毛。种子倒卵状三棱形,只在一面生横膜翅。花期8-11月。

分布:四川中部,重庆。

Chongqing (重庆): Ba Xian (巴县), Chien 13137. **Sichuan** (四川): Dujiangyan (都江堰), T. P. Wang (王作宾) 10142; Pengzhou (彭州), H. B. Mou (牟怀本) 91-10-4, 91-10-3; Tianquan (天全), K. L. Chu (曲桂龄) 3981; Without precise locality, Anonymous 47277.

岩乌头系为乌头亚属中较为特殊的一个系,仅包含两种,即岩乌头和菱叶乌头,它们有着与其他乌头属植物不同的特征,如生境、体态、叶的质地等都较特殊。二者区别甚小,仅叶形特征有区别,前者叶三深裂,后者叶不分裂。我们在一些标本中能检查到两种叶形同时存在的情况,似说明二者有非常近缘的关系。因缺乏野外观察和居群调查研究,我们暂将它们处理为两个独立的种。在这两个种中,子房毛被、甚至花梗毛被都有变异,不是很稳定的性状,不宜作为建立新分类群的依据。

系**7.** 蔓乌头系

Ser. 7. **Volubilia** Steinb. in Fl. URSS 7: 192. 1937; W. T. Wang in Acta Phytotax. Sin. Addit. 1: 76. 1965; et in Fl. Reip. Pop. Sin. 27: 235. 1979.

块根2。茎缠绕。基生叶不存在;叶片掌状深裂至全裂,一回裂片浅裂至细裂。上萼片通常盔形或高盔形。花瓣的瓣片大,上部常膨大,有短或长距。种子有横膜翅。

21. 瓜叶乌头

Aconitum hemsleyanum Pritz. in Bot. Jahrb. 29: 329. 1900; Hand.-Mazz., Symb. Sin. 7: 295, pl. 5, figs. 13-15. 1931; et in Acta Hort. Gotob. 13: 123. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 202. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 235, pl. 48, figs. 1-4. 1979; Icon. Corm. Sin. 1: 691, fig. 1381. 1972; Fl. Tsingling. 1 (2): 257, fig. 220. 1974; Q. E. Yang in Acta Phytotax. Sin. 37: 574. 1999; L. Q. Li & Kadota in Fl. China 6: 191. 2001; Y. Luo & Q. E. Yang in Kew Bull. 57: 752, figs. A-D. 2002. ——*A. sczukinii* var. *hemsleyanum* (Pritz.) Rapaics in Növ. Közl. 6: 161. 1907. Type: China. Hubei (湖北): Fang Xian (房县), Henry 6646 (holotype, K!; photo, PE!; isotypes, E, GH!).

A. lonchodontum Hand.-Mazz. in Acta Hort. Gotob. 13: 122. 1939; Fl. Hupeh. 1: 337.

1976; W. T. Wang in Fl. Reip. Pop. Sin. 27: 227. 1979; K. M. Liu in Fl. Hunan 2: 631. 2000; L. Q. Li & Kadota in Fl. China 6: 187. 2001. Type: China. Hubei (湖北): W Hubei, 1900-08, Wilson 1677 (holotype, K!; photo, PE !).

A. hemsleyanum var. *circinatum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 76. 1965; et in Fl. Reip. Pop. Sin. 27: 236, pl. 48, fig. 5. 1979; et in Acta Bot. Yunnan. 6: 365, fig. 1: 4-6. 1984; L. Q. Li & Kadota in Fl. China 6: 191. 2001. Type: China. Sichuan (四川): Mt. Emeishan (峨眉山), alt. 2200-2900 m, 1957-08-06, G. H. Yang (杨光辉) 56439 (holotype, PE!; isotype, KUN!).

A. hemsleyanum var. *elongatum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 77. 1965; et in Fl. Reip. Pop. Sin. 27: 236, pl. 48, fig. 6. 1979; et in Acta Bot. Yunnan. 4: 131. 1982; L. Q. Li & Kadota in Fl. China 6: 191. 2001. Type: China. Sichuan (四川): Mt. Erlangshan (二郎山), alt. 1900-2800 m, 1953-10-09, H. L. Tsiang (蒋兴麟) 37985 (holotype, PE!; isotype, SZ!).

A. chingtungense W. T. Wang in Acta Phytotax. Sin. Addit. 1: 77. 1965. ——*A. hemsleyanum* var. *chingtungense* (W. T. Wang) W. T. Wang in Fl. Reip. Pop. Sin. 27: 236. 1979; L. Q. Li & Kadota in Fl. China 6: 191. 2001. Type: China. Yunnan (云南): Jingdong (景东), alt. 3100 m, 1956-11-18, B. Y. Qiu (邱炳云) 53791 (holotype, PE!; isotype, KUN!).

A. hsiae W. T. Wang in Acta Phytotax. Sin. Addit. 1: 78, pl. 3, fig. 11. 1965. ——*A. hemsleyanum* var. *hsiae* (W. T. Wang) W. T. Wang in Fl. Reip. Pop. Sin. 27: 238. 1979; L. Q. Li & Kadota in Fl. China 6: 191. 2001. Type: China. Xizang (西藏): Cona (错那), K. C. Hsia & T. K. Mi (夏光成,米泰康) 844 (holotype, M!).

A. austroyunnanense W. T. Wang in Acta Phytotax. Sin. Addit. 1: 81, pl. 4, fig. 15. 1965; et in Fl. Reip. Pop. Sin. 27: 243, pl. 50, pl. 51, fig. 5. 1979; L. Q. Li & Kadota in Fl. China 6: 194. 2001. Type: China. Yunnan (云南): Jingdong (景东), alt. 2100-2500 m, 1956-10-13, B. Y. Qiu (邱炳云) 52820 (holotype, PE!; isotype, KUN!).

A. hemsleyanum var. *unguiculatum* W. T. Wang in Fl. Reip. Pop. Sin. 27: 607, pl. 51, fig. 4. 1979; L. Q. Li & Kadota in Fl. China 6: 191. 2001. Type: China. Yunnan (云南): Weixi (维西), at edge of forest, alt. 3100 m, 1956-08-23, P. I. Mao (毛品一) 403 (holotype, PE!; isotype, KUN!).

A. crassicaule W. T. Wang in Fl. Reip. Pop. Sin. 27: 607. 1979; et in l.c. 27: 240, pl. 48, figs. 7, 8. 1979; L. Q. Li & Kadota in Fl. China 6: 192. 2001. Type: China. Yunnan (云南): Gongshan (贡山), in mixed forest, alt. 2800-3000 m, 1940-09-08, K. M. Feng (冯国楣) 7646 (holotype, PE!; isotype, KUN!).

A. weixiense W. T. Wang in Acta Bot. Yunnan. 4: 132, pl. 1, fig. 2, 1982; L. Q. Li & Kadota in Fl. China 6: 192. 2001. Type: China. Yunnan (云南): Weixi (维西), Forrest 28566 (holotype, E).

A. validinerve W. T. Wang in Acta Bot. Yunnan. 6: 369, fig. 4: 4-6, 1984; L. Q. Li & Kadota in Fl. China 6: 195. 2001, syn. nov. Type: China. Sichuan (四川): Muli (木里),

1978-09-14, Muli Division (木里队) 705 (holotype, MS!; isotype, PE!)

A. hemsleyanum var. *puberulum* W. T. Wang & L. Q. Li in Acta Bot. Yunnan. 8: 260. 1986; L. Q. Li & Kadota in Fl. China 6: 192. 2001. Type: China. Xizang (西藏): Nyingchi (林芝), in shrub along the margin of forest, alt. 3200-3500 m, 1983-09-14, Xizang Inst. Biol. Pl. Resour. Exped. (西藏生物所植物资源队) 4020 (holotype, PE!).

A. hemsleyanum var. *lasianthum* W. T. Wang & L. Q. Li in Acta Phytotax. Sin. 25: 29. 1987; L. Q. Li & Kadota in Fl. China 6: 192. 2001. Type: China. Yunnan (云南): Zhongdian (中甸), in *Picea* woods, alt. 3200 m, 1959-09-06, K. M. Feng (冯国楣) 23498 (holotype, PE!; isotype, KUN!).

多年生草本。块根圆锥形,有时多达4-5个,粗壮。茎缠绕,通常无毛,常带紫色,叶在茎上排列稀疏。茎下部叶在开花时枯萎,中部叶的叶片五角形或卵状五角形,长6.5-12 cm,宽8-13 cm,基部心形,三深裂至距基部0.9-3.2 cm处,中央深裂片梯状菱形或卵状菱形,浅裂,边缘具粗齿,叶两面疏被短柔毛或无毛;叶柄比叶片稍短,疏被短柔毛或几无毛。总状花序生于顶端或叶腋,有2-6朵花;轴和花梗无毛或被贴伏的短柔毛,或被开展的柔毛;下部苞片叶状或宽椭圆形,上部苞片小,线形;花梗长2.2-6 cm;小苞片线形;萼片蓝紫色或紫红色,上萼片高盔形、圆筒状盔形或盔形,高2-2.4 cm,下缘长1.7-1.8 cm,直或稍凹;花瓣无毛,距长2-8 mm,向后弯或拳卷;雄蕊无毛,花丝有2枚小齿或全缘;心皮5,通常无毛或子房有柔毛。花期8-10月。

分布:四川,重庆,云南,贵州,西藏,湖北,湖南,江西,安徽,浙江,陕西,河南。

21a. 瓜叶乌头 原变种

var. **hemsleyanum**

本变种的花序轴和花梗无毛或被贴伏的短柔毛。

分布:四川,重庆,云南,贵州,西藏,湖北,湖南,江西,安徽,浙江,陕西,河南。

Anhui (安徽): Yuexi (岳西), Nanjing Sun Yatsen Botanic Garden (南京中山植物园) 7023. **Chongqing** (重庆): Fengdu (丰都), Fuling Med. Pl. (涪陵地区中草药) 395 (MS); Fengjie (奉节), H. F. Zhou & H. Y. Su (周洪富,粟和毅) 111186; Nanchuan (南川), W. P. Fang (方文培) 1026; Pengshui (彭水), Fuling Med. Pl. (涪陵地区中草药) 1328 (MS); Shizhu (石柱), W. H. Wang (王文华) 2371 (CDBI), Sichuan Veg. Exped. (四川植被队) 3222 (CDBI); Wulong (武隆), Sichuan Med. Inst. (四川中药研究所) 76013 (MS); Wuxi (巫溪), G. H. Yang (杨光辉) 59465, 5460 (CDBI), M. H. Chen (陈明华) 006 (MS); Xiushan (秀山), Fuling Med. Pl. (涪陵地区中草药) 758 (MS). **Guizhou** (贵州): Nayong (纳雍), Bijie Division (毕节队) 689 (KUN); Pan Xian (盘县), Anshun Division (安顺队) 887 (KUN). **Henan** (河南): Lingbao (灵宝), J. Q. Fu (傅竞秋) 206 (NAS); Luoning (洛宁), P. G. Wu (吴培根) 651171 (NAS); Lushi (卢氏), Anonymous 34941, Henan Exped. (河南队) 2539, Depart. Agr., Henan Prov. Govern. (河南农业厅) 1006, Pl. Resour. Survey Exped. (植物资源普查队) L0177, J. Q. Fu (傅竞秋) 2081 (NAS); Song Xian (嵩县), W. L. Wang (王万里) 651167 (NAS); Xixia (西峡), Henan Exped. (河南队) 1691. **Hubei** (湖北): Badong (巴东), Hubei Bot. Exped. (鄂植考队) 25054; Enshi (恩施), G. X. Fu & Z. S. Zhang (傅国勋,张志松) 1213; Fang Xian (房县), K. R.

Liu 305; Lichuan (利川), L. Y. Dai & C. H. Qian (戴伦膺,钱重海) 1458; Shengnongjia (神农架), Shengnongjia Bot. Exped. (神农架植物考察队) 11277, 21183, 11958, Sino-Amer W Hubei Bot. Exped. (中美联合鄂西考察队) 69, 154, 388, 1156, 1320, 1777, Z. S. Ren (任再舍) 12648; Xingshan (兴山), T. P. Wang (王作宾) 11901; Without precise locality, Wilson 1677 (E), G. H. Yang (杨光辉) 59810, 59770 (CDBI). **Hunan** (湖南): Sangzhi (桑植), Anonymous 216, Beijing Division (北京队) 2516, L. H. Liu (刘林翰) 9067. **Jiangxi** (江西): Wuning (武宁), S. S. Lai (赖书绅) 3083. **Shaanxi** (陕西): Hanyin (汉阴), P. C. Kuo (郭本兆) 1743 (CDBI); Hu Xian (户县), P. C. Kuo (郭本兆) 614, 858; Mt. Huashan (华山), T. P. Wang (王作宾) 19700 (KUN), K. S. Hao (郝景盛) 4021; Mt. Zhongnanshan (终南山), F. T. Wang et al. (汪发瓒等) 504; Ningshan (宁陕), Z. W. Chang (张振万) 1434; Shanyang (山阳), T. P. Wang (王作宾) 16343 (KUN). **Sichuan** (四川): An Xian (安县), An Xian Division (安县队) 780179 (MS); Beichuan (北川), D. C. Zhao (赵德成) 0001 (MS); Butuo (布拖), Liangshan Med. Pl. (凉山中草药) 795 (MS); Ebian (峨边), C. W. Yao (姚仲吾) 3081 (NAS); Ganluo (甘洛), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 4298; Hanyuan (汉源), T. P. Wang (王作宾) 9649; Hongxi (洪溪), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 1347; Hongya (洪雅), W. K. Bao (包维楷) 1390 (CDBI); Jiangyou (江油), Jiangyou Division (江油队) 780218 (MS); Jinyang (金阳), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 3057, Jinyang Division (金阳队) 698 (MS); Kangding (康定), Y. P. Dong et al. (董冶平等) 1775; Leibo (雷波), T. T. Yu (俞德浚) 4114, Sichuan Econ. Pl. Exped. (四川经济植物调查队) 158, 461 (CDBI); Luding (泸定), H. L. Tsiang (蒋兴麟) 35465, Sichuan Veg. Exped. (四川植被队) 23493, 32105, 32020, Y. Luo & Y. B. Luo (罗艳,罗毅波) 388; Lushan (芦山), Lushan Division (芦山队) 78-420 (MS); Mabian (马边), Mabian Division (马边组) 719 (MS); Mao Xian (茂县), S. Y. Chen et al. (陈善墉等) 5945 (SZ), Y. Luo & Y. B. Luo (罗艳,罗毅波) 301; Meigu (美姑), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 1865; Mianning (冕宁), Anonymous 550 (MS); Muli (木里), Q. S. Zhao et al. (赵清盛等) 7966 (PE, CDBI), Muli Division (木里队) 626, 675, 705 (MS); Mt. Emeishan (峨眉山), J. H. Xiong et al. (熊济华等) 32274, 32348, 31844, T. H. Tu (杜大华) 588, G. H. Yang (杨光辉) 57402, 56439; Ningnan (宁南), Ningnan Division (宁南组) 310 (MS); Pengzhou (彭州), W. J. Zhang & H. B. Mou (张文锦,牟怀本) 92-8-18b; Pingshan (屏山), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 972; Pingwu (平武), T. L. Dai et al. (戴天伦等) 65-33 (MS); Puge (普格), Puge Division (普格队) 581 (MS); Shimian (石棉), G. H. Xu (徐国洪) 25618 (CDBI); Tianquan (天全), H. L. Tsiang (蒋兴麟) 37985, 37385, 35355, 35347, K. C. Kuan & W. T. Wang (关克俭,王文采) 1933, 3221, T. H. Tu (杜大华) 4615, D. Y. Peng (彭定一) (CDBI), Sichuan Veg. Exped. (四川植被队) 46629 (CDBI); Xide (喜德), Xichang Inst. Drug Control (西昌药检所) 357 (MS); Yuexi (越西), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 3537. **Xizang** (西藏): Cona (错那), K. C. Hsia & T. K. Mi (夏光成,米泰康) 844 (M), Supplementary Qinghai-Xizang Exped. (青藏补点) 751754; Nyingchi (林芝), Xizang Inst. Biol. Pl. Resour. Exped. (西藏生物所植物资源队) 4020. **Yunnan** (云南): Daguan (大关), NE Yunnan Division (滇东北队) 428

(KUN); Dali (大理), M. Chen (陈谋) 3135 (PE, NAS), Q. E. Yang (杨亲二) 8942 (KUN); Dêqên (德钦), Anonymous 24079, Q. E. Yang (杨亲二) 8922; Gongshan (贡山), K. M. Feng (冯国楣) 6957, 7646 (KUN); Jianchuan (剑川), W. T. Wang (王文采) 465; Jingdong (景东), B. Y. Qiu (邱炳云) 52820, 53100, 53791, Y. P. Chang (张英伯) 784 (KUN); Qiaojia (巧家), S. Z. Yang (杨声智) s.n. (KUN); W Yunnan (云南西部), without precise locality, Forrest 28905, 28948; Weishan (巍山), G. Y. Gao & P. Tan (高光跃,谭沛) 06; Weixi (维西), K. M. Feng (冯国楣) 24079 (KUN), P. I. Mao (毛品一) 403 (KUN); Xinping (新平), S. K. Wu (武素功) 445 (KUN); Yongde (永德), T. P. Zhu (朱太平) 201 (KUN); Zhenxiong (镇雄), D. D. Tao (陶德定) 7090 (KUN); Zhongdian (中甸), K. M. Feng (冯国楣) 23498 (KUN), J. S. Yang (杨竞生) 84-1169. **Zhejiang** (浙江): Mt. Tianmushan (天目山), Anonymous 31180, Fudan Univ. (复旦大学) 10318, Zhejiang Pl. Resour. Exped. (浙江植物资源普查队) 29557.

本种是我国乌头属植物中分布较广(图13),极为多型的一个种。比较稳定的性状是叶的形态,通常叶片深裂,分裂程度较近缘类群的叶片小。但其他在乌头属中较为稳定的重要分类性状,诸如花梗毛被、上萼片的形状等在本种都有极大的变异。其他一些本来就不稳定的性状,如距的长度、形状和子房的毛被等的变化更是难于把握。杨亲二(1999)在研究云南乌头属植物时,已经对本种进行了详细的修订工作,在此基础上,我们进一步进行深入研究。在查看标本室的乌头属植物时,我们发现四川木里的显脉乌头*A. validinerve*和湖北兴山的长齿乌头*A. lonchodontum* (Luo & Yang, 2002)的形态特征基本上符合本种,仅上萼片稍低为盔形而有区别。鉴于上萼片的形状在本种居群间和居群内都有很大变化,故应归并。

本种因为分布广泛,形态性状多变,如能利用综合手段对其进行深入研究,将对认识乌头属植物性状变异规律及属内的分化和演化有重要价值。

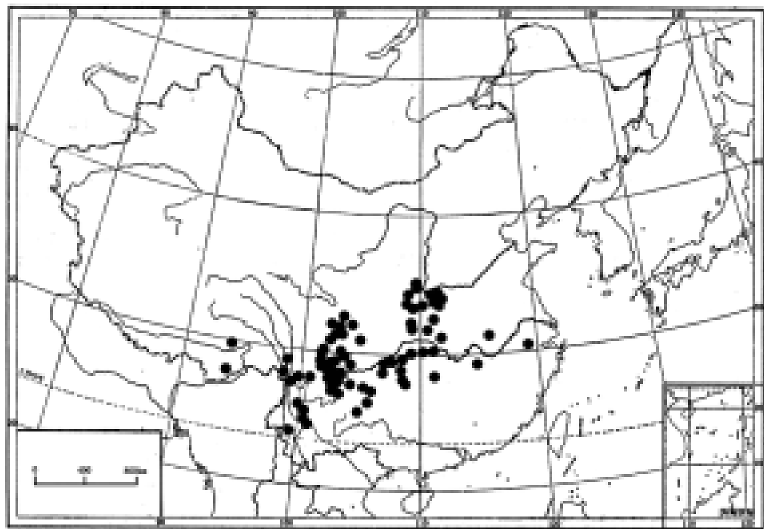


图**13**　瓜叶乌头的分布
Fig. 13.　Distribution of *Aconitum hemsleyanum.*

21b. 展毛瓜叶乌头 变种

var. **atropurpureum** (Hand.-Mazz.) W. T. Wang in Fl. Reip. Pop. Sin. 27: 236. 1979; L. Q. Li & Kadota in Fl. China 6: 191. 2001. ——*A. atropurpureum* Hand.-Mazz. in Acta Hort. Gotob. 13: 124. 1939. Type: China. Sichuan (四川): Dujiangyan (都江堰), alt. 2100-2300 m, 1910-10-08, Wilson 4527 (holotype, K!).

与原变种的区别在于花梗被开展的柔毛。

分布:四川,重庆。

Chongqing (重庆): Wuxi (巫溪), G. H. Yang (杨光辉) 65460. **Sichuan** (四川): Wenchuan (汶川), Y. Luo & Y. B. Luo (罗艳,罗毅波) 405; Without precise locality, Wilson 4527 (K).

22. 珠芽乌头

Aconitum bulbilliferum Hand.-Mazz. in Sitzgsanz. Akad. Wiss. Wien Math.-Nat. Kl. 62: 220. 1925; et Symb. Sin. 7: 296, t. 8, fig. 1. 1931; et in Acta Hort. Gotob. 13: 124. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 199. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 241. 1979; Kadota in Natur. Environ. Sci. Res. 12: 1, figs. 1, 3A. 1999; L. Q. Li & Kadota in Fl. China 6: 193. 2001. Type: China. Sichuan (四川): Huili (会理), alt. 3600 m, 1914-09-17, Handel-Mazzetti 5202 (holotype, WU!; isotypes, WU!, E!, K!, P!).

多年生草本。块根圆柱形。茎缠绕,上部疏被短柔毛或近无毛;珠芽腋生,暗褐色。叶片纸质,心状五角形,长5.5-9 cm,宽6-9 cm,三深裂至距基部6-10 mm处,中央深裂片菱状卵形,顶端长渐尖或尾尖;叶柄比叶片稍长。总状花序腋生或顶生,疏生1-6朵花;苞片叶状;花梗平展或向上弯曲,近无毛,长1.5-4.5 cm;小苞片生花梗中部,叶状;萼片紫褐色,外面几无毛,上萼片高盔形,高2.5-3 cm,下缘直或稍凹,长1.5-1.8 cm;花瓣无毛,距长,拳卷;雄蕊无毛,花丝有2枚小齿或全缘;心皮5,无毛。花期9-10月。

分布:四川会理和米易之间的龙舟山一带。

Sichuan (四川): Huili (会理), Handel-Mazzetti 5202 (WU, E, K, P), Y. Luo & Y. S. Chen (罗艳,陈又生) 548.

本种与瓜叶乌头非常相似,仅叶腋生有珠芽而比较特别。虽然在瓜叶乌头中有时也能发现珠芽,但是会理分布的本种植物珠芽的存在很稳定。我们在野外也观察到了这种现象,本种珠芽的数目很多,几乎每个叶腋里都生有2-3个珠芽。它的生境也较特殊,生长在海拔为3400-3600 m一带的竹林中,通常与竹子缠绕在一起。而其他藤本状乌头分布的海拔相对较低,尤其瓜叶乌头甚至在海拔1300 m的地方都有分布。这种珠芽的特征是由于生境影响还是植物本身遗传稳定的性状还需要深入研究。

23. 黄草乌

Aconitum vilmorinianum Kom. in Rep. Sp. Nov. 7: 145. 1909; Hand.-Mazz. in Acta Hort. Gotob. 13: 131. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 245, pl. 49, figs. 6-8, pl. 57, fig. 7. 1979; Icon. Corm. Sin. 1: 692, fig. 1383. 1972; L. Q. Li & Kadota in Fl. China 6: 194. 2001. Type: China. Yunnan (云南): Qiaojia (巧家), 1908-10-05, Maire s.n. (holotype, E!).

A. mairei Lévl. in Rep. Sp. Nov. 13: 341. 1914. Type: China. Yunnan (云南):

Lan-Gui-Tsin, alt. 3000 m, 1913-10, Maire s.n. (holotype, E!).

多年生草本。块根椭圆球形或胡萝卜形。茎缠绕,长达4 m,疏被反曲的短柔毛或几无毛,分枝。叶片坚纸质,五角形,长5-10 cm,宽8-15.5 cm。基部宽心形,三全裂或裂至近基部,中央全裂片宽菱形,急尖或短渐尖,表面疏被紧贴的短柔毛,背面只沿脉疏被短柔毛;叶柄与叶片近等长。花序有3-6朵花;轴和花梗密被淡黄色反曲短柔毛,或被开展柔毛;花梗长2-4 cm;小苞片生花梗中部或下部,线形;萼片蓝紫色,外面密被短柔毛,上萼片高盔形,高1.7-2 cm,下缘长1.5-1.6 cm。花瓣无毛,距长约3 mm,向后弯曲;雄蕊无毛,花丝全缘或有2枚小齿;心皮5,无毛或子房上部疏生短毛。种子三棱形,只在一面密生横膜翅。花期8-10月。

分布:四川西南部,云南中部、西部和东北部,贵州西部。

23a. 黄草乌　原变种

var. **vilmorinianum**

本变种的花序轴和花梗密被淡黄色反曲短柔毛。

分布:四川西南部,云南中部、西部和东北部,贵州西部。

Sichuan (四川): Huidong (会东), Sichuan Med. Inst. (四川中药研究所) 0004 (MS), T. L. Dai & S. P. Tang (戴天伦,唐世平) 11867 (NAS); Huili (会理), Y. F. Liang et al. (梁永福等) 84-13, Z. He et al. (何铸等) 11534 (MS); Ningnan (宁南), Y. F. Liang et al. (梁永福等) 84-35. **Yunnan** (云南): Baoshan (保山), J. K. Ding (丁靖恺) s.n. (KUN); Dali (大理), T. N. Liou (刘慎谔) 1054, 16709, 20839 (KUN); Kunming (昆明), K. M. Feng (冯国楣) 130, 10426 (KUN), B. Y. Qiu (邱炳云) 51033, 55112 (KUN), X. Chow (周铉) 46 (KUN), Q. E. Yang (杨亲二) 8826 (KUN), Q. E. Yang (杨亲二) 8850; Luquan (禄劝), X. Gong (龚洵) s.n. (KUN); Luoping (罗平), Anonymous 09; Shidian (施甸), F. G. Pan (潘福根) 84 (KUN); Songming (嵩明), Y. P. Chang (张英伯) 143 (KUN), B. Y. Qiu (邱炳云) 55389 (KUN); Xundian (寻甸), Anonymous 05 (KUN); Yuxi (玉溪), S. K. Wu (武素功) 84 (KUN)。

23b. 展毛黄草乌　变种

var. **patentipilum** W. T. Wang in Acta Phytotax. Sin. Addit. 1: 82. 1965; et in Fl. Reip. Pop. Sin. 27: 247. 1979; L. Q. Li & Kadota in Fl. China 6: 194. 2001. Type: China. Yunnan (云南): Luquan (禄劝), alt. 2300 m, 1952-10-29, P. I. Mao (毛品一) 01512 (holotype, PE!; isotype, KUN!).

与原变种的区别在于花序轴和花梗被开展柔毛。

分布:四川西南部,云南中部至东北部。

Sichuan (四川): Huidong (会东), P. Guo (郭平) 88-013, Y. F. Liang et al. (梁永福等) 84-26, Sichuan Med. Stat. (四川中药材站) 3-003. **Yunnan** (云南): Qiaojia (巧家), S. Z. Yang (杨声智) s.n. (KUN); Songming (嵩明), P. I. Mao (毛品一) 140 (KUN), K. M. Feng (冯国楣) 50411 (KUN); Xundian (寻甸), Y. P. Chang (张英伯) 910 (KUN); Luquan (禄劝), P. I. Mao (毛品一) 1512 (PE, KUN)。

24. 紫乌头

Aconitum delavayi Franch. in Bull. Soc. Bot. Fr. 33: 381. 1886; Finet & Gagnep. in

Bull. Soc. Bot. Fr. 51: 507. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 125. 1939, p.p., excl. syn. *A. episcopale* Lévl.; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 194. 1950, p.p.; W. T. Wang in Acta Phytotax. Sin. Addit. 1: 76. 1965; Icon. Corm. Sin. 1: 691, fig. 1382. 1972; W. T. Wang in Fl. Reip. Pop. Sin. 27: 284, pl. 70, figs. 5, 6; Q. E. Yang in Acta Phytotax. Sin. 37: 579. 1999; L. Q. Li & Kadota in Fl. China 6: 207. 2001. Type: China. Yunnan (云南): Eryuan (洱源), alt. 3200 m, 1885-10-20, Delavay 1850 (holotype, P!).

A. delavayi var. *leiocarpum* Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 507. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 125. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 194. 1950, p.p. , excl. syn. *A. episcopale* Lévl. et E. E. Maire 907; Lauener & Green in Not. Bot. Gard. Edinb. 23: 575. 1961, p.p., excl. syn. *A. episcopale* Lévl. Type: China. Yunnan (云南): Dali (大理), 1884-09, Delavay 1041 (holotype, P!).

A. tripartitum Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 195. 1950. Type: China. Yunnan (云南): Dali (大理), in open situations amongst dwarf cane, alt. 3000-3300 m, Forrest 6873 (holotype, E!).

A. episcopale var. *villosulipes* W. T. Wang in Acta Phytotax. Sin. 31: 204. 1993; L. Q. Li & Kadota in Fl. China 6: 196. 2001. Type: China. Yunnan (云南): Dali (大理), 1944-07-16, H. C. Wang (王汉臣) 4458 (holotype, PE!).

A. henryi var. *pilocarpum* W. T. Wang & L. Q. Li in Acta Phytotax. Sin. 25: 29, fig. 2: 3, 1987; L. Q. Li & Kadota in Fl. China 6: 198. 2001, syn. nov. Type: China. Sichuan (四川): Muli (木里), in forest along stream, alt. 2100 m, 1982-10-29, F. T. Pu & G. Yao (溥发鼎,姚淦) 595 (holotype, PE!; isotype, NAS!).

A. volubile var. *tenuisectum* auct. non Regel: Franch. in l.c.

A. villosum var. *flexuosum* auct. non Reich.: Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 507. 1904, p.p.

A. episcopale auct. non Lévl.: W. T. Wang in Fl. Reip. Pop. Sin. 27: 248. 1979, p.p. major.

多年生草本。茎通常缠绕,茎上疏被短柔毛或近无毛。茎中部叶具有稍长柄;叶片五角形,长4.5-8.5 cm,宽5.2-10 cm,基部心形,三全裂,一回裂片近羽状深裂,中央深裂片卵状菱形,表面疏被短柔毛,背面无毛;叶柄与叶片近等长,几无毛或疏被短柔毛。花序顶生或腋生,有3-8朵花;花序轴被开展的黄毛;下部苞片叶状,其他苞片长圆状线形;花梗长2-6 cm,顶端弯曲;小苞片生花梗中部或下部,狭线形;萼片蓝紫色,上萼片高盔形,高1.8-2.4 cm,下缘长1.4-1.6 cm;花瓣无毛,距长约4 mm,向后弯曲;雄蕊无毛,花丝全缘或有2枚小齿;心皮5,无毛或被白色短柔毛。花期9-10月。

分布:四川西南部,云南东北部和西北部。

Sichuan (四川): Huili (会理), Smith 5301 (WU); Muli (木里), F. T. Pu & G. Yao (溥发鼎,姚淦) 595 (PE, NAS), Q. S. Zhao et al. (赵清盛等) 8664 (CDBI); Yanbian (盐边), Yanbian Division (盐边队) 447 (MS); Yanyuan (盐源), Yanyuan Division (盐源队) 610 (MS); Yuexi (越西), M. Li (李鸣) 012 (M); Without precise locality, Wilson 3112 a? (K). **Yunnan** (云南): Binchuan (宾川), R. C. Ching (秦仁昌) 24717 (KUN), N. T. Liou (刘慎谔) 21918 (KUN);

Dali (大理), Forrest 28100, Sino-Amer. Yunnan Bot. Exped. (中美云南植物考察队) 1110 (KUN), F. G. Pan (潘福根) 84-05 (KUN), Q. E. Yang (杨亲二) 8830, 8831 (KUN), 9404; Dongchuan (东川), Y. C. Li & S. B. Lan (李运昌,蓝顺彬) 283; Eryuan (洱源), W. T. Wang (王文采) 503; Fengqing (凤庆), C. Chen (陈介) 94 (KUN); Heqing (鹤庆), R. C. Ching (秦仁昌) 25557, 25574 (KUN), Q. E. Yang (杨亲二) 8844 (KUN); Jianchuan (剑川), Y. Q. Mo (莫云强) (KUN); Lanping (兰坪), S. K. Wu (武素功) 9055; Lijiang (丽江), R. C. Ching (秦仁昌) 21656 (KUN); Yongsheng (永胜), 701 Division (701组) 73015 (KUN)。

本种以前在四川没有记载过,我们通过查看标本,发现在四川西南部木里、越西、会理一带也有此种的分布 (图14)。

25. 西南乌头

Aconitum episcopale Lévl. in Rep. Sp. Nov. 13: 341. 1914. W. T. Wang in Fl. Reip. Pop. Sin. 27: 248. 1979, p.p., excl. Pl. Yunnan.; et in Acta Phytotax. Sin. 31: 204. 1993; Q. E. Yang in Acta Phytotax. Sin. 37: 585. 1999; L. Q. Li & Kadota in Fl. China 6: 195. 2001. Type: China. Yunnan (云南): Qiaojia (巧家?), alt. 3000 m, 1913-10, Maire 433 (holotype, E!).

A. vilmorinianum var. *altifidum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 82. 1965; et in Fl. Reip. Pop. Sin. 27: 247. 1979. Type: China. Guizhou (贵州): Weining (威宁), 1924-09-29, P. C. Tsoong (钟补勤) 1835 (holotype, PE!).

A. wangii Q. E. Yang in Cathaya 5: 103. 1993, nom. nud.

多年生草本。块根胡萝卜形。茎缠绕,紫色,通常无毛,上部有多数分枝,茎中部叶有稍长柄;叶片心状五角形,长6.8-10 cm,宽9-11 cm,基部心形,三全裂,裂片窄,中央全裂片卵状狭菱形,近羽状深裂,叶两面近无毛。总状花序顶生或腋生,有5-9朵花;轴和花梗被白色贴伏毛;苞片线形;花梗斜展,上部弯曲,长1.5-3 cm;小苞片生中部或下部,线形;萼片深紫红色,外面疏被短柔毛,上萼片高盔形或圆筒状盔形,高2-2.4 cm,下缘稍凹,长1.4-1.6 cm,有短喙;花瓣无毛,距长约3 mm,向后弯曲;雄蕊无毛,花丝全缘或有两枚小齿;心皮5,子房无毛或被柔毛。花期7-11月。

分布:四川西南部,云南西北部,贵州西部。

Guizhou (贵州): Hezhang (赫章), P. H. Yu (禹平华) 1349; Weining (威宁), M. L. Sai (赛明兰) 80001, P. C. Tsoong (钟补勤) 1835, Y. Tsiang (蒋英) 9120 (NAS). **Sichuan** (四川): Butuo (布拖), Liangshan Med. Pl. (凉山中草药) 760 (MS, M); Dechang (德昌), Hu 0431 (MS); Ganluo (甘洛), Ganluo Division (甘洛队) 857 (MS); Hanyuan (汉源), Hanyuan Division

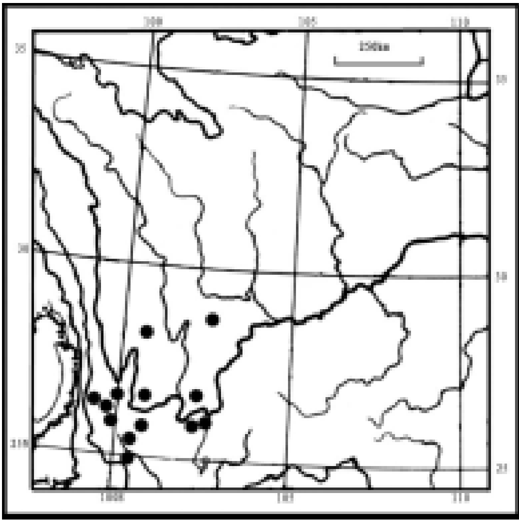


图**14**　紫乌头的分布

Fig. 14.　Distribution of *Aconitum delavayi*.

(汉源队) 977 (MS); Jinyang (金阳), Sichuan Veg. Exped. (四川植被队) 14653 (PE, CDBI); Kangding (康定), Y. P. Huang (黄冶平) 2209; Luding (泸定), W. G. Hu & Z. He (胡文光,何铸) 11546, W. G. Hu (胡文光) 35440, K. C. Kuan & W. T. Wang (关克俭,王文采) 1811, Sichuan Veg. Exped. (四川植被队) 26273, 31492, 31882, 41457 (CDBI), Y. Luo & Y. B. Luo (罗艳,罗毅波) 389; Mianning (冕宁), S. Q. Fu & Y. K. Lai (付善权,赖应坤) 174 (MS); Puge (普格), Y. Luo & Y. S. Chen (罗艳,陈又生) 441; Tianquan (天全), Y. B. Yang (杨亚滨) 40009 (CDBI); Xide (喜德), Anonymous 899 (MS); Yuexi (越西), Xichang Inst. Drug Control (西昌药检所) 920 (MS); Zhaojue (昭觉), Zhaojue Division (昭觉队) 608 (MS). **Yunnan** (云南): Lijiang (丽江), G. Y. Gao & P. Tan (高光跃,谭沛) 014, Q. E. Yang (杨亲二) 8933 (KUN).

26. 弯喙乌头 图15

Aconitum campylorrhynchum Hand.-Mazz. in Acta Hort. Gotob. 13: 126. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 250, pl. 52, figs. 2, 3. 1979; L. Q. Li & Kadota in Fl. China 6: 196. 2001. Type: China. Sichuan (四川): Songpan (松潘), alt. 3200 m, 1922-10-18, H. Smith 3991 (holotype, W; isotype, PE!).

A. campylorrhynchum var. *patentipilum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 83. 1965; et in Fl. Reip. Pop. Sin. 27: 251. 1979; L. Q. Li & Kadota in Fl. China 6: 196. 2001, syn. nov. Type: China. Sichuan (四川): Hongyuan (红原), alt. 3250 m, 1957-09-11, H. Li (李馨) 74566 (holotype, PE!; isotype, SZ!).

A. hemsleyanum var. *pilopetalum* W. T. Wang & L. Q. Li in Acta Phytotax. Sin. 25: 29. 1987; L. Q. Li & Kadota in Fl. China 6: 192. 2001, syn. nov. Type: China. Sichuan (四川): Muli (木里), in moist places in forest, alt. 3250 m, 1984-10-06, Y. F. Liang et al. (梁永福等) 84-55 (holotype, PE!; isotypes, MCH!, KUN!).

多年生草本。块根胡萝卜形。茎缠绕,长1-2 m,上部有分枝。叶片卵状五角形或五角形,长4.8-8 cm,宽4.2-10 cm,三裂至距基部2-2.5 mm处,裂片细,中央全裂片卵状菱形,近羽状深裂,两面疏生短柔毛或近无毛;茎下部叶具较长柄,中部叶柄稍短,长2.2-4.5 cm。总状花序顶生或腋生,顶生花序花多,10-16朵花,腋生花序花较少, 4-6朵花;轴和花梗疏被反曲的短柔毛,有时被略开展的短柔毛;下部苞片叶状,上部苞片线形;花梗斜展上部弯曲,长2-4.5 cm;小苞片生花梗中部或下部;萼片紫红色,上萼片高盔形,高 2-2.8 cm,外面疏被短柔毛,下缘斜上方伸展,长1.4-1.6 cm,有长而向上弯曲的喙;花瓣无毛或被稀疏柔毛,距长约3 mm;雄蕊无毛,花丝全缘;心皮5,子房疏被紧贴的短柔毛。花期8-10月。

分布:四川西部和西南部。

Sichuan (四川): Barkam (马尔康), Anonymous 12; Danba (丹巴), The 8th Forest Management Brigade (第八森林经理大队) 2708; Heishui (黑水), Heishui Division (黑水组) 1185; Hongyuan (红原), H. Li (李馨) 74834 (PE, NAS), 74948, 74111 (PE, SZ), Z. R. Zhang & H. F. Zhou (张泽荣,周洪富) 23586 (PE, SZ), 23825 (SZ, NAS), Y. Luo & Y. B. Luo (罗艳,罗毅波) 332; Jinchuan (金川), The 8th Forest Management Brigade (第八森林经理大队) 4921; Li Xian (理县), H. Li (李馨) 74245 (PE, NAS), D. P. He (何荻平) 46907 (SZ); Mao Xian (茂县), Z. He & Z. L. Zhou (何铸,周子林) 13825 (PE, NAS), 13630 (SZ, NAS), 13716

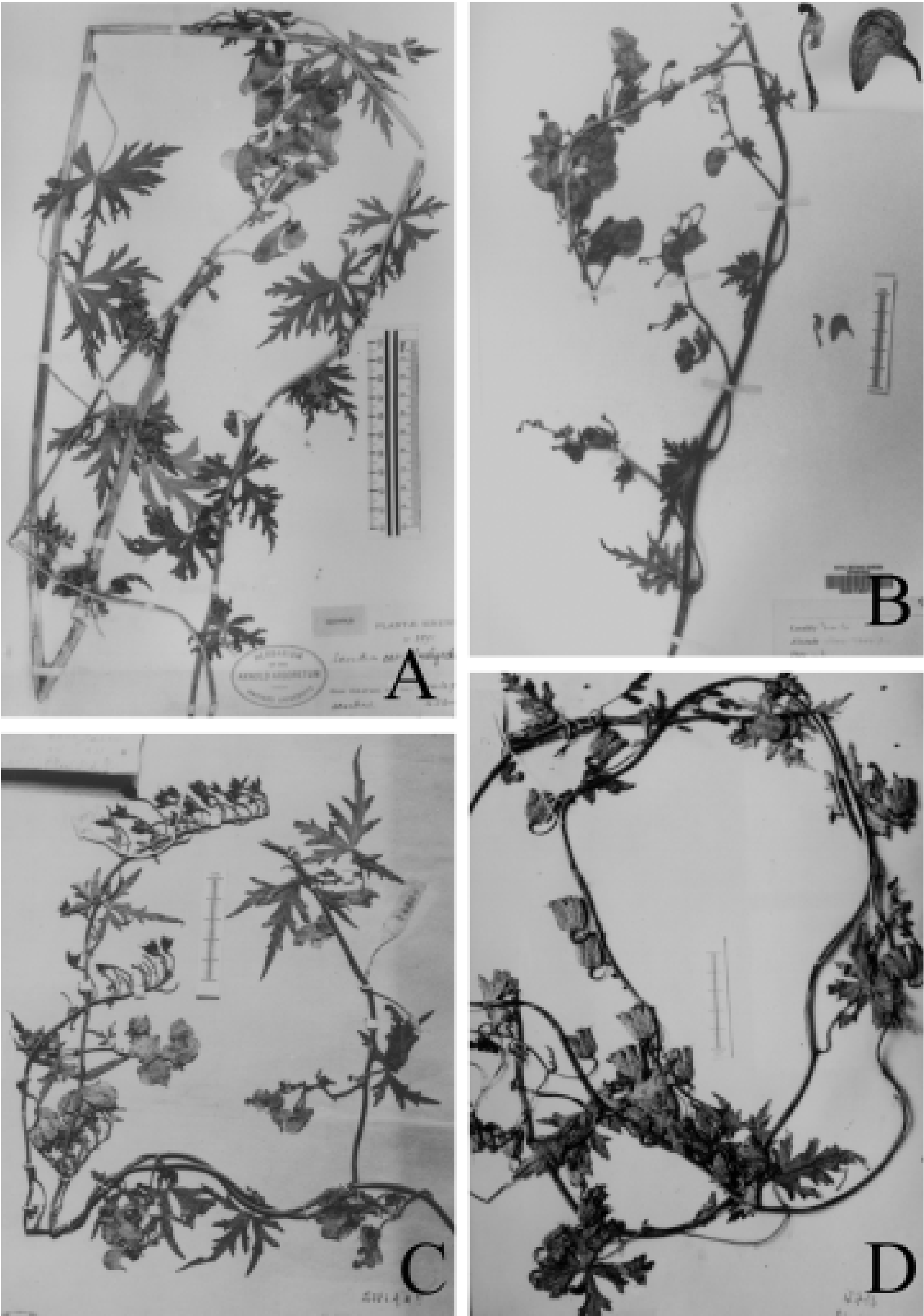


图**15**　弯喙乌头　**A.** 四川松潘, H. Smith 3991 (PE, 等模式)。**B.** 四川木里, Kingdon-Ward 4549 (E)。**C.** 四川红原, 李馨74566 (SZ, *Aconitum campylorrhynchum* var. *patentipilum*的等模式)。**D.** 四川木里, 梁永福等84-55 (MCH, *A. hemsleyanum* var. *pilopetalum*的等模式)。

Fig. 15. *Aconitum campylorrhynchum* Hand.-Mazz. **A,** Songpan, Sichuan, H. Smith 3991 (PE, isotype). **B,** Muli, Sichuan, Kingdon-Ward 4549 (E). **C,** Hongyuan, Sichuan, X. Li 74566 (SZ, isotype of *A. campylorrhynchum* var. *patentipilum* W. T. Wang). **D,** Muli, Sichuan, Y. F. Liang et al. 84-55 (MCH, isotype of *A. hemsleyanum* var. *pilopetalum* W. T. Wang & L. Q. Li).

(NAS), Aba Inst. Drug Control (阿坝州药检所) 1182 (MS); Muli (木里), Kingdon-Ward 4549 (E), Rock 16942, 18276 (E), Qinghai-Xizang Exped. (青藏队) 13095, 14143, Y. F. Liang (梁永福) 84-57, T. T. Yu (俞德浚) 7709, Y. B. Yang & M. F. Wen (杨亚滨,温鸣峰) 383 (CDBI), Y. B. Yang et al. (杨亚滨等) 2052 (CDBI), F. T. Pu & G. Yao (溥发鼎,姚淦) 202 (NAS), Y. Luo & Y. S. Chen (罗艳,陈又生) 528, 531; Pingwu (平武), H. L. Tsiang (蒋兴麟) s.n.; Songpan (松潘), Smith 3991, Wilson 3112 (K); Xiaojin (小金), J. S. Yue & G. J. Song (岳俊三,宋国杰) 64113 (NAS); Yanyuan (盐源), Y. F. Liang et al. (梁永福等) 84-86; Without precise locality, W. P. Fang (方文培) 4488, 4398 (NAS).

本种具有较明显的长而向上弯曲的喙而与近缘种相区别,但喙的形态包括长度或是否弯曲都有很大的变化。产于红原刷经寺附近的居群有着明显上翘的喙(图15:A),但在木里一带的喙长一般不向上弯曲(图15:D)。本种的花梗毛被有一定的变化,花梗通常都被有紧贴而反曲的柔毛,但有时毛被稍微开展。王文采因此根据李馨74566(图15:C)发表了新变种,但我们在SZ和NAS查看到的同号模式,毛被是卷曲的。另外李馨74834也是这样的情况,毛被的形态也产生了变化,我们在红原刷经寺观察到的居群,花梗毛被略微开展而并非是很典型的开展毛类型。

27. 川鄂乌头 图16

Aconitum henryi Pritz. in Bot. Jahrb. 29: 329. 1900, p.p.; Rapaics in Növ.Közl. 6: 155. 1907; Hand.-Mazz. in Acta Hort. Gotob. 13: 129. 1939; Icon. Corm. Sin. 1: 693, fig. 1385. 1972; W. T. Wang in Fl. Reip. Pop. Sin. 27: 254, pl. 54, figs. 5, 6. 1979; L. Q. Li & Kadota in Fl. China 6: 197. 2001. Type: China. Hubei (湖北): Without precise locality, 1889, Henry 6979 (lectotype, here designated, K!; isolectotype, E!).

A. henryi var. *compositum* Hand.-Mazz. in Acta Hort. Gotob. 13: 130. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 256. 1979; L. Q. Li & Kadota in Fl. China 6: 198. 2001, syn. nov. Type: China. Chongqing (重庆): Wushan (巫山), 1889, Henry 7017 (holotype, K!).

A. sungpanense Hand.-Mazz. in Acta Hort. Gotob. 13: 130. 1939; Icon. Corm. Sin. 1: 692, fig. 1384. 1972; Fl. Tsingling. 1(2): 258, fig. 221. 1974; W. T. Wang in Fl. Reip. Pop. Sin. 27: 253, pl. 51, fig. 9, pl. 54, figs. 1, 2. 1979; L. Q. Li & Kadota in Fl. China 6: 196. 2001, syn. nov. Type: China. Sichuan (四川): Without precise locality, alt. 1530-2600 m, 1904-08, Wilson 3111 (holotype, K!; isotype, K!).

A. sungpanense var. *leucanthum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 84. 1965; et in Fl. Reip. Pop. Sin. 27: 253. 1979; L. Q. Li & Kadota in Fl. China 6: 197. 2001, syn. nov. Type: China. Chongqing (重庆): Chengkou (城口), alt. 1450-2000 m, 1958-09-20, T. L. Dai (戴天伦) 104990 (holotype, PE!; isotype, NAS!).

A. liouii W. T. Wang in Acta Phytotax. Sin. Addit. 1: 83, pl. 4, fig. 16. 1965; et in Fl. Reip. Pop. Sin. 27: 251, pl. 53, figs. 6-8. 1979; L. Q. Li & Kadota in Fl. China 6: 197. 2001. Type: China. Shaanxi (陕西): Mt. Taibaishan (太白山), alt. 2880-2950 m, 1937-09-11, T. N. Liou & P. C. Tsoong (刘慎谔,钟补求) 780 (holotype, PE!).

A. shensiense W. T. Wang in Acta Phytotax. Sin. Addit. 1: 84, pl. 4, fig. 14. 1965; et in Fl.



图**16**　川鄂乌头　**A.** 四川,采集地不详, Wilson 3111 (K, *Aconitum sungpanense* Hand.-Mazz.的主模式)。**B.** 陕西周至, 张襄明116 (NAS, *A. shensiense* W. T. Wang的等模式)。**C.** 湖北,采集地不详,Henry 6979 (E,同号后选模式)。**D.** 湖北, 采集地点不详, Henry 7012A (E,同号副模式)。

Fig. 16. *Aconitum henryi* Pritz. **A,** without precise locality, Sichuan, Wilson 3111 (K, holotype of *A. sungpanense* Hand.-Mazz.). **B,** Zhouzhi, Shaanxi, H. M. Zhang 116 (NAS, isotype of *A. shensiense* W. T. Wang). **C,** without precise locality, Hubei, Henry 6979 (E, isolectotype of *A. henryi*). **D,** without precise locality, Hubei, Henry 7012A (E, isoparatype of *A. henryi*).

Reip. Pop. Sin. 27: 253, pl. 53, figs. 9-11. 1979; L. Q. Li & Kadota in Fl. China 6: 197. 2001, syn. nov. Type: China. Shaanxi (陕西): Zhouzhi (周至), alt. 1640 m, 1958-08-16, H. M. Chang (张襄明) 116 (holotype, WUK!; isotypes, KUN!, NAS!).

多年生草本。块根胡萝卜形或长圆形。茎缠绕,长1-2.5 m,无毛或近无毛。茎中部叶有稍长柄;叶片五角形,长5.8-10 cm,宽8-12 cm,三全裂,全裂片几无柄或有明显的柄,中央全裂片披针形,卵状菱形或狭菱形,在下部三裂或不分裂,边缘有许多粗锯齿,两面被稀疏短柔毛;叶柄比叶片短,无毛或疏生反曲的短毛。总状花序腋生或顶生,有5-9朵花;轴和花梗无毛或疏被反曲的短柔毛;下部苞片三裂,其他苞片线形;花梗长2-4 cm,通常在上部弯曲;小苞片生于花梗的中部或上部;萼片蓝色、淡紫红色、黄绿色或淡白色,外面无毛或疏被短柔毛,上萼片高盔形或盔形,高1.8-2.4 cm,下缘长1.4-1.6 cm,稍凹;花瓣无毛或疏被短毛,距长约2 mm,向后弯曲;花丝无毛或疏被短毛,花丝全缘或有2枚小齿;子房无毛或被紧贴的短毛。花期8-9月。

分布:四川北部和东部,重庆东部,湖北北部,青海东部,甘肃南部,陕西南部。

Chongqing (重庆): Chengkou (城口), Farges 634 (P), T. L. Dai (戴天伦) 102150 (PE, CDBI), 102625, 102677, 106397 (PE, NAS), 104175, 104990, 102449, 107502, 101849, 102092, F. M. Zhang (张富明) 01008, 01009; Hechuan (合川), Hechuan Division (合川队) 835 (MS); Kai Xian (开县), Wan Xian Med. Pl. (万县地区中草药) 73-9 (MS); Wushan (巫山), Henry 7017 (K), G. H. Yang (杨光辉) 59664; Wuxi (巫溪), Y. D. Chen et al. (陈耀东等) 2207,G. H. Yang (杨光辉) 65416 (PE, CDBI, KUN), K. L. Chu (曲桂龄) 2022, Sichuan Med. Inst. (四川中药研究所) 7200-031 (MS), M. L. She et al. (佘孟兰等) 64207 (NAS). **Gansu** (甘肃): Dangchang (宕昌), Q. E. Yang (杨亲二) 92010; Jonê (卓尼), Purdom 1084 (E, K); Hui Xian (徽县), T. P. Wang (王作宾) 15076; Kang Xian (康县), Z. Y. Zhang (张志英) 16808, 16856, 17091; Lanzhou (兰州), Y. Q. He (何叶琪) 5447, Q. E. Yang (杨亲二) 92035; Li Xian (礼县), Q. X. Li (李全喜) 750; Liancheng (连城), Qinghai-Xizang Exped. (青藏队) 3406; Luqu (碌曲), Q. R. Wang & M. S. Yan (王庆瑞,晏民生) 10932; Minshan (岷山), Rock 14516; Mt. Liupanshan (六盘山), Yellow River Exped. (黄河队) 1956; Pingliang (平凉), Yellow River Exped. (黄河队) 1942; T'ao River Basin, Rock 13205, 14860 (K); Tianshui (天水), K. M. Liou (刘继孟) 10555; Wen Xian (文县), Q. E. Yang (杨亲二) 92015; Wushan (武山), Yellow River Exped. (黄河队) 4179; Xigu (西固), W. Y. Hsia (夏纬英) 6535; Xinji (新集), S. Q. Zhong & P. L. Yang (仲士奇,杨平礼) 1171; Yongdeng (永登), P. C. Tsoong (钟补求) 10104; Yuzhong (榆中), Yellow River Exped. (黄河队) 3122, 5931. **Hubei** (湖北): Jianshi (建始), Hubei (鄂) 1693 (PE, NAS), Hubei (鄂) 1251; Xingshan (兴山), Henry 6979 (E); Without precise locality, Henry 7012A (E, GH). **Qinghai** (青海): Huzhu (互助), G. X. Liu (刘更喜) s.n.; Xunhua (循化), J. Y. Zhang (张建勇) 196 (NAS), Q. E. Yang (杨亲二) 9502. **Shaanxi** (陕西): Feng Xian (凤县), Z. Y. Zhang (张志英) 290 (NAS); Foping (佛坪), T. N. Liou & P. C. Tsoong (刘慎谔,钟补求) 3246; Hanzhong (汉中), J. W. Wang et al. (汪劲武等) 166; Liuba (留坝), K. T. Fu (傅坤俊) 6264; Lueyang (略阳), K. T. Fu (傅坤俊) 5807, 5823; Mt. Taibaishan (太白山), T. N. Liou & P. C. Tsoong (刘慎谔,钟补求) 58, 189, 780, K. T. Fu (傅坤

俊) 2495, W. Y. Hsia (夏纬英) 6, K. S. Hao (郝景盛) 340, 4482, J. X. Yang (杨金祥) 2184, F. T. Wang et al. (汪发瓒等) 005, 321, 333, 379, 628, 631, G. Y. Gao (高光跃) 012 (M); Yang Xian (洋县), H. W. Kung (孔宪武) 3515; Zhouzhi (周至), X. M. Zhang (张襄明) 116 (WUK, NAS, KUN); Ziyang (紫阳), P. Y. Li (李培元) 4708. **Sichuan** (四川): Guangyuan (广元), Sichuan Med. Inst. (四川中药研究所) 484 (MS); Nanjiang (南江), Da Xian Med. Pl. Exped. (达县中草药资源普查) 770; Nanping (南坪), Q. X. Li & X. C. Zhao (李全喜,赵兴存) 2809, Sichuan Econ. Pl. Exped. (四川经济植物调查队) 971 (CDBI), X. N. Tang et al. (唐贤能等) 486 (CDBI); Pingwu (平武), Anonymous 10916, 913060 (MS), Z. Y. Chen (陈泽映) s.n. (SZ); Qingchuan (青川), F. T. Wang (汪发瓒) 22321, Anonymous 2933 (MS), Sichuan Med. Inst. (四川中药研究所) 2909 (MS); Songpan (松潘), Wilson 4529 (K), W. P. Fang (方文培) 4374, F. M. Zhang (张富明) 01007, Z. W. Li et al. (李卓伟等) 032 (CDBI); Tongjiang (通江), Tongjiang Division (通江队) 1360; Wangcang (旺苍), Sichuan Med. Inst. (四川中药研究所) 167 (MS), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 210 (CDBI); Wanyuan (万源), P. Y. Li (李培元) 6178, Baisha Division (白沙队) 413 (MS), Wanyuan Division (万源队) 324 (MS); Xuanhan (宣汉), Anonymous 1580 (MS); Zoigê (若尔盖), Aba Inst. Drug Control (阿坝州药检所) 135 (MS); Without precise locality, Wilson 3111 (K).

本种的叶形变异非常大,在分类和名称上长期以来一直存在着很多混乱。

Pritzel(1900)根据Henry采自湖北的3号标本(Henry 6979(图16:C),7012(图18:D), 7012A(图16: D)描述了*A. henryi*(叶全裂,叶的一回裂片不分裂)。1904年Finet和Gagnepain发表了东亚乌头属专著,根据Farges采自四川城口(现归重庆)的标本(Farges 165)(图18:A)和Wilson采自湖北的标本(Wilson 2625)(图18: B)发表了*A. cannabifolium*(叶分裂成5个小叶,小叶披针形,边缘有许多锯齿)。Rapaics(1907)认为二者的形态很相似,将它们合并,采用了Pritzel(1900)的种的概念。我们查看了Henry采的标本,发现这3号标本并不属于同一类群,它们的叶和花的形态比较一致,但是花梗毛被不同,其中Henry 7012(图18:D)为开展毛,另外两份被稀疏的卷曲毛或近无毛。Handel-Mazzetti(1939)在处理Pritzel的种时,已经将花梗毛被的形状作为了重要的分类性状,他认为开展毛的Henry 7012应该属于*A. cannabifolium*,其余的才是*A. henryi*;我们基本同意Handel-Mazzetti的观点,这两个形态相似的类群包含两个实体,一为开展毛类型,一为具稀疏卷曲毛至近无毛的类型。

但是Handel-Mazzetti同时又根据Henry采自重庆巫山的标本(Henry 7017)和Purdom采自甘肃卓尼的标本(Purdom 1084)描述了变种*A. henryi* var. *compositum*,认为其叶片细裂而与原变种相区别。他还可能考虑到了地理分布的隔离,根据Wilson在四川西部采的两份标本(Wilson 3111 (图16:A),采集地点不详;Wilson 4529,采自松潘)描述了另外一个新种*A. sungpanense*(叶分裂成三小叶,花梗疏被卷曲毛或近无毛),他没有意识到他的种与Pritzel以及Finet和Gagnepain的种都很近缘,这样就造成了以后定名的混乱。以后,王文采(1979)接受Handel-Mazzetti的处理,认为Pritzel的种*A. henryi*是被卷曲毛的,而将被开展毛的植物作为一个变种处理,即*A. henryi* var. *villosum*。

我们检查了大量有关的标本,发现这些分类群的分布区是紧密连接甚至重叠的,主要分布在甘肃南部、四川北部至东部、重庆东部和湖北西北部(图17)。它们的叶形变化相当

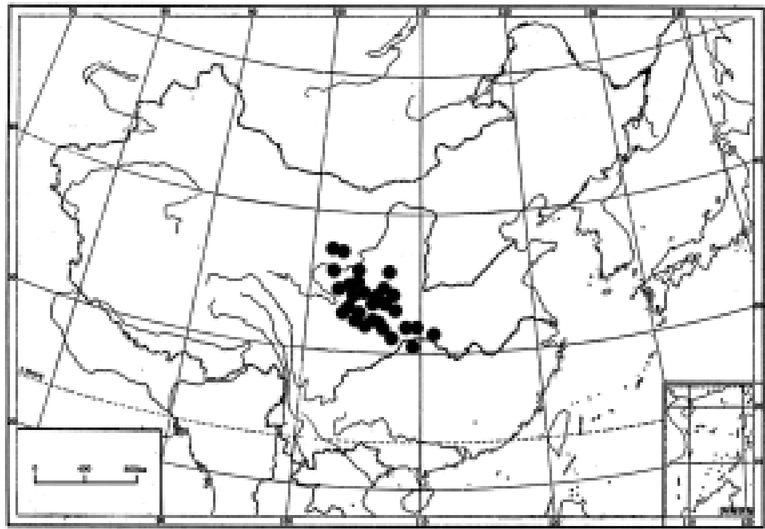


图17 川鄂乌头的分布
Fig. 17. Distribution of *Aconitum henryi.*

大,叶一般都全裂成3-5裂片,通常基部裂片缩成柄状,因此叶片看起来像复叶,由3-5个小叶组成。主要的变化是这些小叶的形态,有时为披针形,边缘有整齐的锯齿,有时三深裂或浅裂,有时羽状深裂。大麻叶乌头就是由于叶形类似大麻叶而得名,但这个性状只是其中的一个较极端的变异而已。裂片较细的情形在一些幼小的植株里常能观察到,Henry 7017、Purdom 1184和张富民01007等都是这种叶形。因此如仅根据叶形的区别建立不同的种是不可取的。于是我们将这些植物根据花梗毛被的性状作为两个不同的种处理,花梗被卷曲毛或近无毛的为川鄂乌头,花梗毛被开展的为大麻叶乌头。

以后发表的一些新分类群,如*A. sungpanense* var. *leucanthum*、*A. shensiense*和*A. liouii*都与川鄂乌头没有本质的区别。其中*A. shensiense*据描述花梗被开展毛,我们看到主模式标本花梗上的毛并非完全开展,在NAS查看的同号模式(图16:B)的花梗是被卷曲毛的,故在此也将其置于川鄂乌头。

28. 大麻叶乌头 图18

Aconitum cannabifolium Franch. ex Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 503, pl. 6, fig. 27. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 128. 1939, p.p.; W. T. Wang in Fl. Reip. Pop. Sin. 27: 254. 1979; L. Q. Li & Kadota in Fl. China 6: 197. 2001. Type: China. Chongqing (重庆): Chengkou (城口), alt. 1400 m, Farges 165 (syntype, P!; isosyntypes, P!, K!); Hubei (湖北): northern Hubei, without precise locality, 1901-09, Wilson 2625 (syntype, K; isosyntype, E!).

A. henryi var. *villosum* W. T. Wang in Fl. Reip. Pop. Sin. 27: 608. 1979; L. Q. Li & Kadota in Fl. China 6: 198. 2001, syn. nov. Type: China. Chongqing (重庆): Chengkou (城口), in shrub, alt. 1600 m, 1958-08-18, T. L. Dai (戴天伦) 104123 (holotype, PE!; isotype, SZ!).

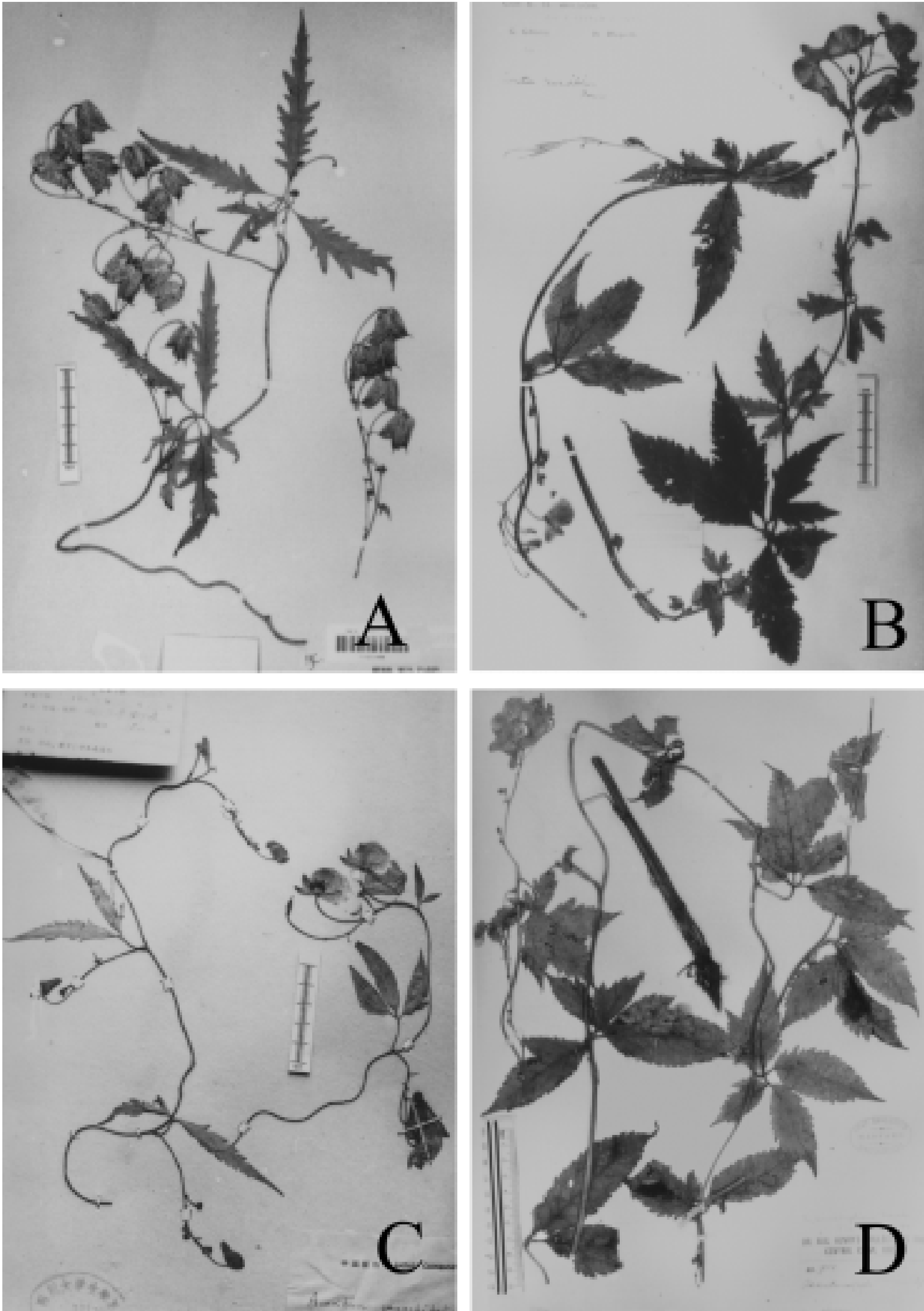


图18　大麻叶乌头　**A.** 重庆城口,Farges 165 (P,后选模式)。**B.** 湖北北部,Wilson 2625 (E,副模式)。**C.** 重庆城口,戴天伦104123 (SZ, *Aconitum henryi* var. *villosum* W. T. Wang的等模式)。**D.** 湖北,采集地点不详,Henry 7012 (GH)。
Fig. 18. *Aconitum cannabifolium* Franch. **A,** Chengkou, Chongqing, Farges 165 (P, lectotype). **B,** N Hubei, Wilson 2625 (E, isoparatype). **C,** Chengkou, Chongqing, T. L. Dai 104123 (SZ, isotype of *A. henryi* var. *villosum* W. T. Wang). **D,** without precise locality, Hubei, Henry 7012 (GH).

A. sungpanense var. *villosum* W. T. Wang in Bull. Bot. Res. North-East Forest Inst. 9 (2): 5. 1989; L. Q. Li & Kadota in Fl. China 6: 197. 2001, syn. nov. Type: China. Hunan (湖南): Anhua (安化), alt. 1600 m, 1972-09-11, Y. J. Li & Z. D. Wen (李虞俊,温俊达) 0056 (holotype, Herb. Inst. Med. Hunan; isotype, PE!)

A. henryi auct. non Finet & Gagnep.: Pritz. in Bot. Jahrb. 29: 329. 1900, p.p. quoad Henry 7012.

多年生草本。茎缠绕,被反曲的短柔毛或近无毛。茎中部叶有稍长柄;叶片草质,五角形,长6.8-10 cm,宽8-12 cm,三全裂,全裂片通常都有柄,中央全裂片披针形、长圆状披针形,椭圆状菱形或狭菱形,在下部三深裂或不裂,边缘密生锯齿,两面几无毛或表面疏生短柔毛;叶柄比叶短,疏被反曲的短柔毛或几无毛。总状花序顶生或腋生,有3-6朵花,轴和花梗被开展的短柔毛;苞片线形;花梗长1.5-3 cm,上部弯曲;小苞片生花梗下部;萼片紫红色稍带绿色,外面疏被短柔毛,上萼片高盔形,高2.1-2.4 cm,下缘稍凹,长1.4-1.6 cm。花瓣无毛,距长约3.5 mm,向后弯曲;雄蕊无毛,花丝全缘;心皮3-5,子房疏生短柔毛或无毛。花期8-9月。

分布:四川东北部,重庆东部,湖北西北部,浙江西部,安徽南部,河南西部,山西南部和陕西东南部。

Anhui (安徽): Jinzhai (金寨), M. B. Deng & H. T. Wei (邓懋彬,魏宏图) 81385 (NAS), G. Yao (姚淦) 81033 (NAS); Qianshan (潜山), B. A. Shen (沈保安) 428, 87418. **Chongqing** (重庆): Chengkou (城口), Farges 165 (P, K); T. L. Dai (戴天伦) 104123 (PE, SZ, NAS). **Henan** (河南): Dengfeng (登封), Song (嵩) 51, 50707; Lingbao (灵宝), Q. S. Yang (杨秋生); Lushi (卢氏), H. M. Shi et al. (时华明等) 2681. **Hubei** (湖北): Badong (巴东), Hubei Bot. Exped. (鄂植考队) 25056; Quanziping (圈子坪), G. H. Yang (杨光辉) 59781 (PE, CDBI, KUN); Shengnongjia (神农架), Hubei Bot. Exped. (鄂植考队) 25203; Without precise locality, Henry 7012 (GH), Wilson 2625 (E). **Hunan** (湖南): Anhua (安化), Y. J. Li & J. D. Wen (李虞俊,温俊达) 0056. **Shaanxi** (陕西): Mt. Taibaishan (太白山), G. Y. Gao (高光跃) 01 (M); Mt. Zhongnanshan (终南山), T. P. Wang (王作宾) 2137; Shang Xian (商县), T. P. Wang (王作宾) 16146, 16236 (PE, KUN); Shanyang (山阳), T. P. Wang (王作宾) 16365. **Shanxi** (山西): Hengqu (垣曲), S. Y. Bao (包士英) 658; Yuncheng (运城), S. Y. Bao (包士英) 882. **Sichuan** (四川): Nanjiang (南江), Anonymous 921, 1083 (MS); Tongjiang (通江), Anonymous 1150 (MS). **Zhejiang** (浙江): Changhua (昌化), Anonymous 30532; Mt. Tianmushan (天目山), Y. W. Law (刘玉壶) 1237 (NAS).

系**8.** 乌头系

Ser. 8. **Inflata** Steinb. in Fl. URSS 7: 217. 1937; W. T. Wang in Fl. Reip. Pop. Sin. 27: 259. 1979.

块根2。茎直立,偶尔蔓生或缠绕。基生叶通常不存在或与茎下部叶在开花时枯萎;叶片通常掌状全裂,少数深裂,一回裂片浅裂至细裂。上萼片常为高盔形,有时盔形。花瓣的瓣片大,通常外面上部膨大,有短距。种子有横膜翅。

29. 乌头

Aconitum carmichaeli Debx. in Acta Soc. Linn. Bord. 33: 87. 1879; Hand.-Mazz. in Acta Hort. Gotob. 13: 117. 1939; Munz in Gent. Herb. 6: 488, figs. 261, 262. 1945; Icon. Corm. Sin. 1: 695, fig. 1390. 1972; Fl. Tsingling. 1 (2): 261, fig. 223. 1974; W. T. Wang in Fl. Reip. Pop. Sin. 27: 264, pl. 58, figs. 1-5. 1979; Y. Luo & Q. E. Yang in Acta Phytotax. Sin. 39: 443, fig. 1. 2001; L. Q. Li & Kadota in Fl. China 6: 200. 2001. Type: China. Shandong (山东): Yantai (烟台), Forbes & Carmichael s.n.

A. jiulongense W. T. Wang in Acta Bot. Yunnan. 6: 371, fig. 2: 3-5. 1984; L. Q. Li & Kadota in Fl. China 6: 206. 2001. Type: China. Sichuan (四川): Jiulong (九龙), in grassy area along trail, alt. 2500 m, 1979-07-08, Jiulong Division (九龙队) 0200 (holotype, MS!; isotype, PE !).

多年生草本,高60-120 cm。块根2-4个,倒圆锥形。茎中部之上疏被反曲的短柔毛,等距离生叶,分枝。茎下部叶在开花时枯萎,中部叶有稍长柄;叶片薄革质或纸质,五角形,长6-11 cm,宽9-15 cm,基部浅心形,三全裂,或裂至近基部,中央全裂片宽菱形,有时倒卵状菱形或菱形,近羽状分裂,表面疏被短伏毛,背面通常只沿脉疏被短柔毛;叶柄长1-2.5 cm,疏被短柔毛。总状花序顶生,有时有分枝,长6-10 cm;轴和花梗密被反曲而紧贴的短柔毛;下面苞片叶状三裂,其他的狭卵形至披针形;花梗长1.5-3 cm;小苞片生花梗中部或下部;萼片蓝紫色,外面被短柔毛,上萼片高盔形,高2-2.4 cm,下缘稍凹,长1.7-2.2 cm;花瓣无毛,距长约2 mm,通常拳卷;雄蕊无毛或疏被短毛,花丝有2枚小齿或全缘;心皮3-5,子房多少被短柔毛。种子三棱形,在二面密生横膜翅。花期9-10月。

分布:四川,云南,湖北,贵州,湖南,广西北部,广东北部,江西,浙江,江苏,安徽,陕西南部,河南南部,山东东部,辽宁南部。

本种特征明显,又主要属于栽培植物,在我国各主要标本馆中很少出现其错误鉴定,故在此不引证标本。

乌头是我国乌头属中分布最广的种,被各地作为药材广泛栽培。四川为主要的栽培产区,被称作“川乌”,尤以江油产量最大。乌头由于栽培历史悠久,在形态上和染色体倍性(2n=4x, 6x, 8x)上都有较多变化。

我们(罗艳,杨亲二, 2001)在归并九龙乌头*A. jiulongense*时,错误地指出乌头*A. carmichaeli*的模式产于山东曲阜。其原因是我们当初不知道山东烟台古称芝罘,未经细考,率将原始文献中的“Chifu”理解为“曲阜”。本文通讯作者后来读到已故我国台湾大学教授台静农先生的《始经离乱》一文,始知我国山东烟台古称芝罘,遂意识到上述错误。

系**9.** 兴安乌头系

Ser. 9. **Ambigua** Steinb. in Fl. URSS 7: 220. 1937; W. T. Wang in Fl. Reip. Pop. Sin. 27: 281. 1979.

块根2。茎直立。基生叶通常不存在;叶片掌状全裂,一回裂片多少细裂。上萼片盔形,船形,少有高盔形。花瓣的瓣片上部不膨大,距短,偶尔不存在。

30. 缺刻乌头

Aconitum incisofidum W. T. Wang in Acta Phytotax. Sin. Addit. 1: 87. 1965; et in Fl.

Reip. Pop. Sin. 27: 281, pl. 66, figs. 4-6. 1979; L. Q. Li & Kadota in Fl. China 6: 205. 2001. Type: China. Sichuan (四川): Muli (木里), alt. 3900 m, 1937-09-01, T. T. Yu (俞德浚) 13127 (holotype, PE!; isotype, KUN!).

A. sinonapelloides W. T. Wang in Acta Phytotax. Sin. Addit. 1: 87. 1965; et in Fl. Reip. Pop. Sin. 27: 297. 1979; L. Q. Li & Kadota in Fl. China 6: 213. 2001, syn. nov. Type: China. Sichuan (四川): Muli (木里), alt. 4475-4600 m, 1915-08-06, Handel-Mazzetti 7486 (holotype, WU!).

A. fengii W. T. Wang var. *crispulum* Q. E. Yang in Acta Phytotax. Sin. 37: 572. 1999, syn. nov. Type: China. Yunnan (云南): Zhongdian (中甸), 1962-08-26, Zhongdian Division (中甸队) 1390 (holotype, KUN!; isotype, PE!).

A. napelloides Hand.-Mazz., Symb. Sin. 7: 287. 1931, non Sw. ex Reichb. 1820.

A. falciforme auct. non Hand.-Mazz.: Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 201. 1950, p.p., quoad pl. Sichuan.

多年生草本,高30-100 cm。块根胡萝卜形或纺锤形。茎上部疏被反曲的短柔毛。茎下部叶在开花时枯萎;茎中部叶有稍长柄,叶片圆五角形,长4-12 cm,宽4-10 cm,三全裂或裂至近基部,裂片较细,羽状深裂,中央全裂片菱形或宽菱形,表面被短伏毛,背面几无毛;叶柄与叶近等长或稍短。总状花序顶生,上部花密集,下部花疏生,具长柄;轴和花梗密被反曲的短柔毛;下部苞片叶状,上部线形;花梗长1-5 cm;小苞片生于花梗下部至上部,条形或线形;萼片蓝紫色,外面无毛或有短柔毛,上萼片低盔形,高1.6-1.8 cm,下缘直,长1.5-1.6 cm,有时稍凹;花瓣无毛,距长约2.5 mm,向后弯曲;雄蕊无毛,花丝有2枚小齿或全缘;心皮3-5,无毛或疏被短柔毛。花期8-9月。

分布:四川西南部,云南西北部。

Sichuan (四川): Daocheng (稻城), Qinghai-Xizang Exped. (青藏队) 5451 (CDBI, KUN), Q. S. Zhao et al. (赵清盛等) 8062 (SZ); Muli (木里), Rock 16719, 16750, 24193 (E), Forrest 20845 (E), Handel-Mazzetti 7486 (WU), T. T. Yu (俞德浚) 13127 (PE, KUN), Chengdu Inst. Drug Control (成都药检所) 28, Q. S. Zhao (赵清盛) 6335 (CDBI), Muli Division (木里队) 650 (MS), Qinghai-Xizang Exped. (青藏队) 13783, 14403 (KUN). **Yunnan** (云南): Zhongdian (中甸), Forrest 10845 (E), Zhongdian Division (中甸队) 1390 (PE, KUN), K. M. Feng (冯国楣) 2099 (KUN)。

1931年,Handel-Mazzetti根据他采自四川木里的一份标本(Handel-Mazzetti 7486)发表了*A. napelloides*, 但这个名称是个晚出同名,王文采(1965)新拟名为拟缺刻乌头*A. sinonapelloides*。但在我国乌头属植物标本中,长期以来都未能鉴定出该种。我们通过查看大量的标本,发现它在体态、叶形态、花梗毛被和花的构造上与王文采(1965)根据俞德浚采自木里的标本(俞德浚13127)描述的种缺刻乌头*A. incisofidum*没有区别。这个种叶全裂,花梗被卷曲毛,上萼片低盔形。Fletcher和Lauener(1950)在研究爱丁堡皇家植物园标本馆的中国乌头属植物时,把四川木里和云南中甸产的这类植物都鉴定为Handel-Mazzetti(1939)描述的种*A. falciforme*。

31． 冷杉林乌头

Aconitum abietetorum W. T. Wang & L. Q. Li in Acta Phytotax. Sin. 25: 32, pl. 3, fig. 3, 1987; L. Q. Li & Kadota in Fl. China 6: 208. 2001. Type: China. Sichuan (四川): Muli (木里), along the margin of *Abies* woods, alt. 3800 m, 1983-09-05, L. H. Liu (刘伦辉) s.n. (holotype, PE!).

多年生草本。块根不详。茎中部疏被开展的短柔毛,上部被反曲而贴伏的短柔毛。茎中部叶具长柄;叶片纸质,五角形,长约8 cm,宽约10 cm,基部心形,三全裂,中央全裂片菱形,羽状深裂,末回裂片条形或卵形,叶表面被贴伏的短柔毛,下面近无毛;叶柄长约5 cm,疏被伸展的短柔毛。总状花序顶生,或有分枝生于花序轴下部的叶腋,疏生6-12朵花,长20-30 cm;花序轴及花梗被开展的短柔毛;下部苞片叶状,上部的线形;花梗较长,长1.5-4.5 cm;小苞片生于花梗基部之上;萼片蓝紫色,外面无毛,上萼片盔形或浅盔形,高1.3-1.7 cm,从基部至喙长1.4-1.7 cm,下缘稍凹;花瓣无毛,距长约2 mm,向后弯曲;雄蕊无毛,花丝全缘;心皮5,无毛。花期9月。

分布:四川木里。

Sichuan (四川): Muli (木里), L. H. Liu et al. (刘伦辉等) s.n.。

本种是根据刘伦辉等采自木里的标本 (刘伦辉s.n.) 发表的,标本共有两份,从它的叶形和花的结构特征看,它与缺刻乌头的关系较近,仅花梗毛被开展与之区别,缺刻乌头花梗毛被是卷曲的;二者都分布在木里,因此它们是否是同一个种还是关系很近的两个种,由于缺乏更多的标本和野外调查,对此我们还无法确定。

32． 冕宁乌头

Aconitum legendrei Hand-Mazz. in Acta Hort. Gotob. 13: 112. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 284, pl. 62, fig. 9, pl. 66, figs. 7-9. 1979; L. Q. Li & Kadota in Fl. China 6: 206. 2001. Type: China. Sichuan (四川): Mianning (冕宁), alt. 2600 m, 1911-09-08, Legendre 1459 (holotype, P!; photo, PE!).

A. zhaojiueense W. T. Wang & Hsiao in Bull. Bot. Lab. North-East Forest Inst. 8 (8): 16, fig. 2: 3, 4, 1980; L. Q. Li & Kadota in Fl. China 6: 188. 2001, syn. nov. Type: China. Sichuan (四川): Zhaojue (昭觉), alt. 2200 m, 1978-09-04, C. S. Li (李传仕) s.n. (holotype, M!; isotype, PE!).

多年生草本,高50-160 cm。块根倒圆锥形。茎下部无毛,中部以上密被反曲的白色短柔毛。茎下部叶在开花时枯萎;茎中部叶具稍长柄;叶片圆五角形,长6-9 cm,宽7-10 cm,三全裂或裂至近基部,中央全裂片菱形或宽菱形,基部狭楔形,两面疏被短柔毛;叶柄长1-3 cm,茎下部的叶柄通常超过3 cm。总状花序顶生,有多数密集的花,轴和花梗密被伸展的白色或黄色短柔毛;下部苞片三裂叶状,上部苞片条形;花梗长0.5-3 cm;小苞片线形;萼片蓝紫色、黄绿色或白色,外面被短柔毛,上萼片盔状船形或盔形,高0.7-1.5 cm,下缘长1.0-1.4 cm;花瓣疏生柔毛,距长约1 mm,直立或稍向后弯曲;雄蕊无毛,花丝全缘或有2枚小齿;心皮3-5,无毛或疏被短柔毛。种子只在一面生横膜翅。花期8-9月。

分布:四川西南部。

32a. 冕宁乌头　原变种　图19:B,C

var. **legendrei**

本变种上萼片盔形,高1-1.5 cm。

分布:四川西南部。

Sichuan (四川): Huidong (会东), Experimental Material (实验材料) No. 20 (M); Mianning (冕宁), Legendre 1459 (P), Sichuan Med. Inst. (四川中药研究所) 0184 (M), Y. F. Liang (梁永福) 84-80 (MCH), T. T. Yu (俞德浚) 1764 (PE, NAS), Mianning Med. Comp. (冕宁药材公司) 88-008, Y. Luo & Y. S. Chen (罗艳,陈又生) 448, Sichuan Med. Stat. (四川中药材站) s.n., S. F. Zhu (朱水法) 20336; Shimian (石棉), P. Guo (郭平) 88-011, Q. E. Yang (杨亲二) 9303; Yanbian (盐边), Yanbian Division (盐边队) 0418 (MS); Zhaojue (昭觉), C. S. Li (李传仕) s.n.; Without precise locality, W. P. Fang (方文培) 6871 (NAS).

32b. 低盔冕宁乌头　变种　新组合 图19: A, D; 图20

var. **albovillosum** (Chen & Liu) Y. Luo & Q. E. Yang, comb. nov.

A. forrestii var. *albovillosum* (Chen & Liu) W. T. Wang in Acta Phytotax. Sin. Addit. 1: 68. 1965; et in Fl. Reip. Pop. Sin. 27: 213. 1979; L. Q. Li & Kadota in Fl. China 6: 180. 2001. ——*A. carmichaeli* Debx. var. *albovillosum* Chen & Liu in Bull. Fan Mem. Inst. Biol. Bot. ser. 11: 47. 1941. Type: China. Sichuan (四川): Muli (木里), on grassy slope, alt. 3900 m, 1937-09-22, T. T. Yu (俞德浚) 14343 (holotype, PE!; isotypes, GH!, KUN!).

A. pycnanthum W. T. Wang in Acta Bot. Yunnan. 6: 372, fig. 4: 1-3, 1984; L. Q. Li & Kadota in Fl. China 6: 215. 2001, syn. nov. Type: China. Sichuan (四川): Muli (木里), on grassy slope, alt. 3950 m, 1978-09-09, Q. S. Zhao et al. (赵清盛等) 8504 (holotype, CDBI!; isotypes, PE! SZ!)

A. piepunense auct. non Hand.-Mazz.: Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 204, 1950, p.p. quoad Forrest 28375.

A. forrestii auct. non Stapf: W. T. Wang in Acta Phytotax. Sin. Addit. 1: 68. 1965, p.p. quoad S. K. Wu 3608.

A varietate praecedenti sepalo superiore naviculari-galeato, a rostro ad apicem 7-9 mm alto differt.

本变种与原变种的区别在于上萼片盔状船形,高0.7-0.9 cm,而原变种上萼片盔形,高1-1.5 cm。

分布:四川木里、盐源一带。

Sichuan (四川): Muli (木里), Forrest 28375 (PE, E), T. T. Yu (俞德浚) 14343 (PE, GH, KUN), T. T. Yu (俞德浚) 14518, Q. S. Zhao (赵清盛) 8569 (SZ, CDBI), Q. S. Zhao et al. (赵清盛等) 3282 (SZ, CDBI), 8377 (CDBI), 8504 (PE, CDBI, SZ), Sichuan Veg. Exped. (四川植被队) 542 (NAS, CDBI), F. T. Pu & Y. B. Yang (溥发鼎,杨亚滨) 453 (CDBI), Muli Division (木里队) 618 (MS), Q. E. Yang (杨亲二) 93014, Qinghai-Xizang Exped. (青藏队) 13660, S. K. Wu (武素功) 2513, 3608, 2609, 3366 (KUN), K. M. Feng (冯国楣) 2937 (KUN); Yanyuan (盐源), Yanyuan Division (盐源队) 606 (MS, PE, M).

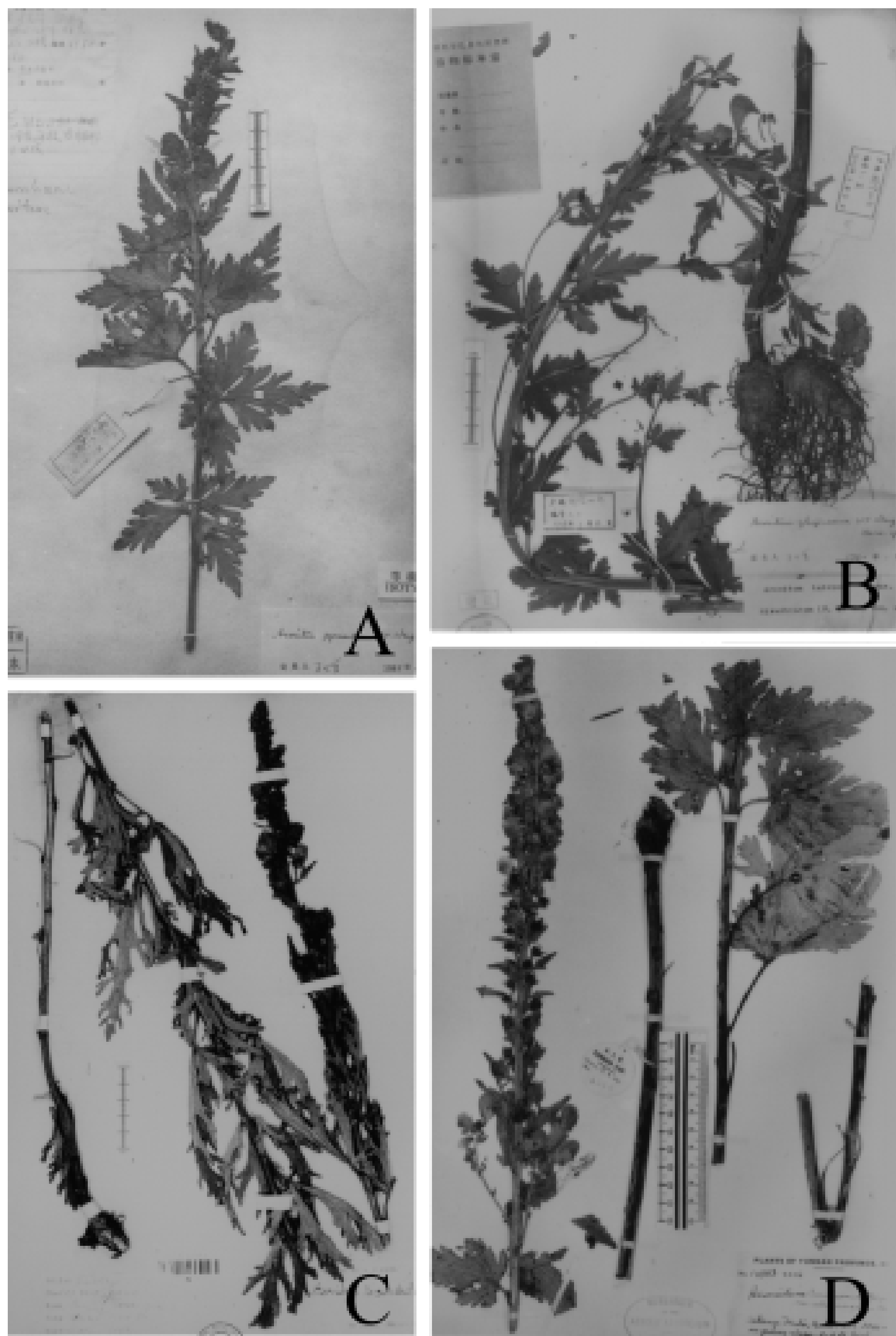


图19 **A, D,** 低盔冕宁乌头 **A.** 四川木里,赵清盛等8504 (CDBI, *Aconitum pycnanthum* W. T. Wang的等模式)。**D.** 四川木里,俞德浚14343 (GH,等模式)。**B, C.** 冕宁乌头(原变种)。**B.** 四川昭觉, 李传仕无号 (PE, *A. zhaojiueense* W. T. Wang的等模式)。**C.** 四川冕宁, Legendre 1459 (P,主模式)。

Fig. 19. **A, D,** *Aconitum legendrei* var. *albovillosum* (Chen & Liu) Y. Luo & Q. E. Yang. **A,** Muli, Sichuan, C. S. Zhao et al. 8504 (CDBI, isotype of *A. pycnanthum* W. T. Wang). **D,** Muli, Sichuan, T. T. Yu 14343 (GH, isotype). **B, C,** *A. legendrei* Hand.-Mazz. var. *legendrei*. **B,** Zhaojue, Sichuan, C. S. Li s.n. (PE, isotype of *A. zhaojiueense* W. T. Wang). **C,** Mianning, Sichuan, Legendre 1459 (P, holotype).

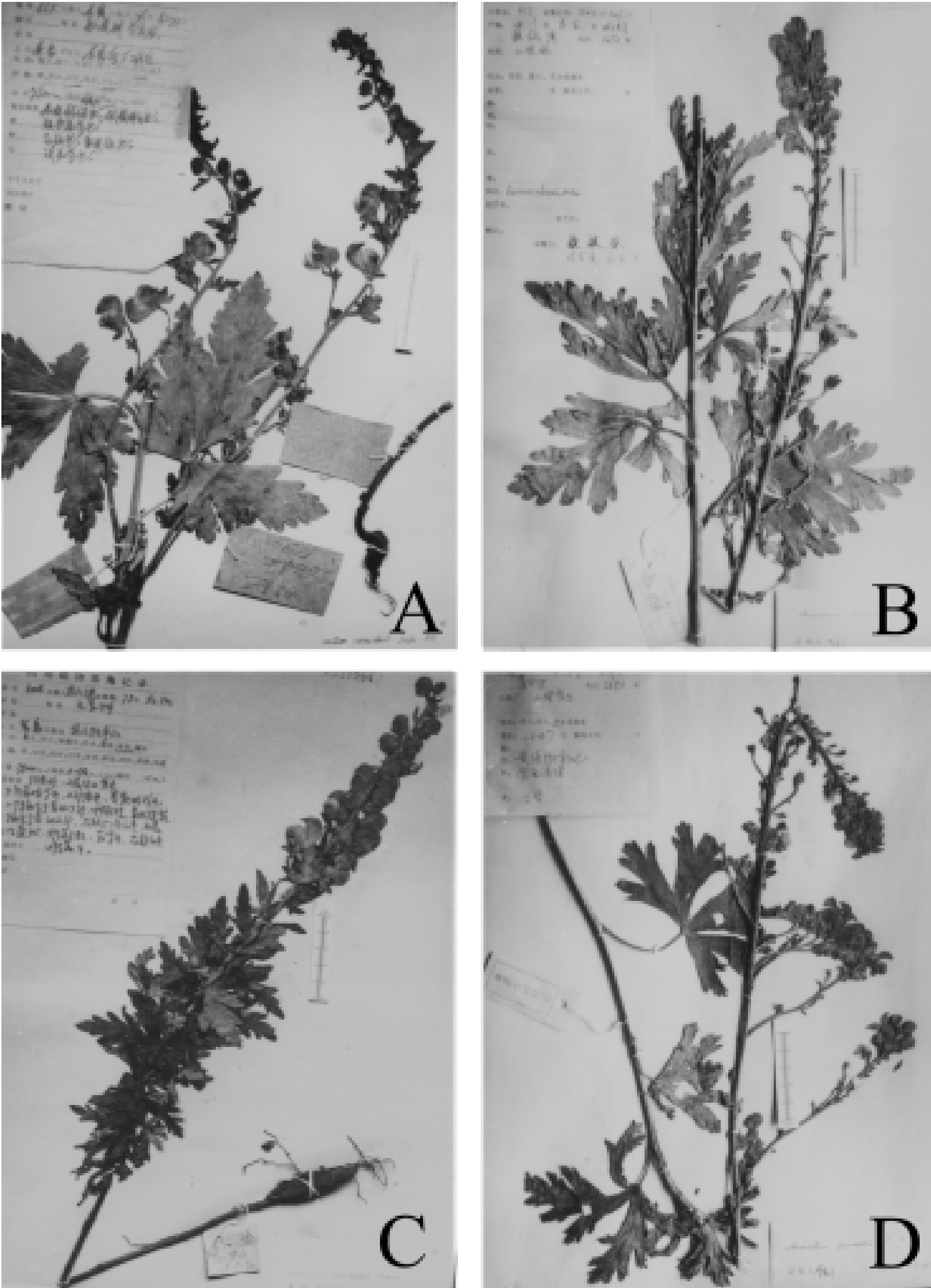


图20 低盔毛宁乌头 **A.** 四川木里,木里队618 (CDBI)。**B.** 四川木里,溥发鼎,杨亚滨453 (CDBI)。**C.** 四川木里, 盐源队606 (PE)。**D.** 四川木里, 四川植被调查队542 (CDBI)。

Fig. 20. *Aconitum legendrei* var. *albovillosum* (Chen & Liu) Y. Luo & Q. E. Yang. **A,** Muli, Sichuan, Muli Division 618 (CDBI). **B,** Muli, Sichuan, F. T. Pu & Y. B. Yang 453 (CDBI). **C,** Muli, Sichuan, Yanyuan Division 606 (PE). **D,** Muli, Sichuan, Sichuan Veg. Exped. 542 (CDBI).

冕宁乌头是根据一份采自四川冕宁的标本——Legendre 1459(图19:C)描述的。我们查看了这份标本,这个种的显著特征是具三全裂的叶和花梗具开展的毛。经查看各大标本馆的标本,发现这个种还在石棉、会东和盐边等地有分布(图21:L)。王文采(1980)根据采自昭觉的一份标本描述了一个新种*A. zhaojiueense*(图19:B),他将其与康定乌头比较而没有与冕宁乌头比较。实际上,该种与Handel-Mazzetti的种无明显区别。它们在体态、叶的分裂程度、上萼片的形状和花梗毛被方面都表现一致。Handel-Mazzetti (1939)提到*A. legendrei*与云南丽江产的丽江乌头 *A. forrestii* Stapf关系较近。这引起了我们对根据木里采的标本描述的变种毛果丽江乌头*A. forrestii* var. *albovillosum*的注意,我们发现这个变种从叶形和花梗毛被的特征上看,更接近冕宁乌头而不是丽江乌头,因此在这里有必要提到这个变种的分类历史。在1941年,陈封怀和刘瑛根据俞德浚采自木里的标本(俞德浚14343)(图19:D)描述了*A. carmichaeli* var. *albovillosum*,名字的来源是因为茎上密被白色绒毛。王文采(1965)认为这个种与丽江乌头的关系较近,将其处理为丽江乌头的变种,并且指出这个变种以子房被毛以及花梗相对较长而与原变种有区别。我们查看了该变种的主模式及3份同号模式,发现它和丽江乌头的关系并不是很近。这两个类群仅花梗和花序轴的毛被相近,都密被黄色或白色的开展毛,但它们的叶形特征完全不同,俞德浚14343具有全裂的叶和长柄,而丽江乌头的叶深裂且叶柄极短,另外它们的花的结构也有区别,在俞德浚的植物中,上萼片短,盔状船形,花相对较小,而在丽江乌头,上萼片盔形,花相对较大。王文采(1965)还记载了四川分布有丽江乌头,引证了武素功3608。我们也查看了这份标本,发现它与俞德浚14343完全相同,并非是丽江乌头。王文采(1984)发表的另外一个采自木里的新种密序乌头*A. pycnanthum*(图19:A)与俞德浚14343和武素功3608也都属同一种。我们通过查看木里的标本和对该地的野外考察,发现产自木里一带的这类植物确实在体态、叶形和花梗毛被上与冕宁乌头颇相似,区别仅在于上萼片的形状和大小,木里的植物上萼片为船形或盔状船形 (图20,21: F-K),而冕宁乌头的上萼片为盔形或高盔形(图21:A-E)。因此我们认为将这类植物处理为冕宁乌头的变种,即*A. legendrei* var. *albovillosum* 似乎更为合理。

冕宁乌头及其变种在花的颜色、花瓣的距和心皮毛被上有一定变异。王文采(1965)依据心皮毛被区分*A. legendrei* var. *albovillosum*和丽江乌头是不可取的,我们发现这个性状变异很大,在不同的居群、不同的个体甚至在同一个体里,有的心皮完全无毛,有的被稀疏的短柔毛,无规律可循。我们同意Handel-Mazzetti(1939)的观点,认为冕宁乌头与丽江乌头关系相对较近;冕宁乌头及其变种在体态和花梗毛被上确实与丽江乌头很相似,但叶形和花的结构有明显差异。

33. 工布乌头　图22:A-C

Aconitum kongboense Lauener in Not. Bot. Gard. Edinb. 25: 17, figs. 1N, 4B. 1963; W. T. Wang in Fl. Reip. Pop. Sin. 27: 288, pl. 62, fig. 14, pl. 65, figs. 1, 2. 1979; L. Q. Li & Kadota in Fl. China 6: 208. 2001. Type: China. Xizang (西藏): Gongbo’gyamda (工布江达), on grassy banks and amongst open scrubs, alt. 3050 m, 1938-08-14, Ludlow et al. 6831 (holotype, BM!; isotype, E!).

A. lhasaense Lauener in l.c. 25: 15, figs. 1K, 2K. Type: China. Xizang (西藏): Lhasa (拉萨), alt. 4270 m, 1943-08-19, Ludlow & Sherriff 9880 (holotype, BM!; isotype, E).

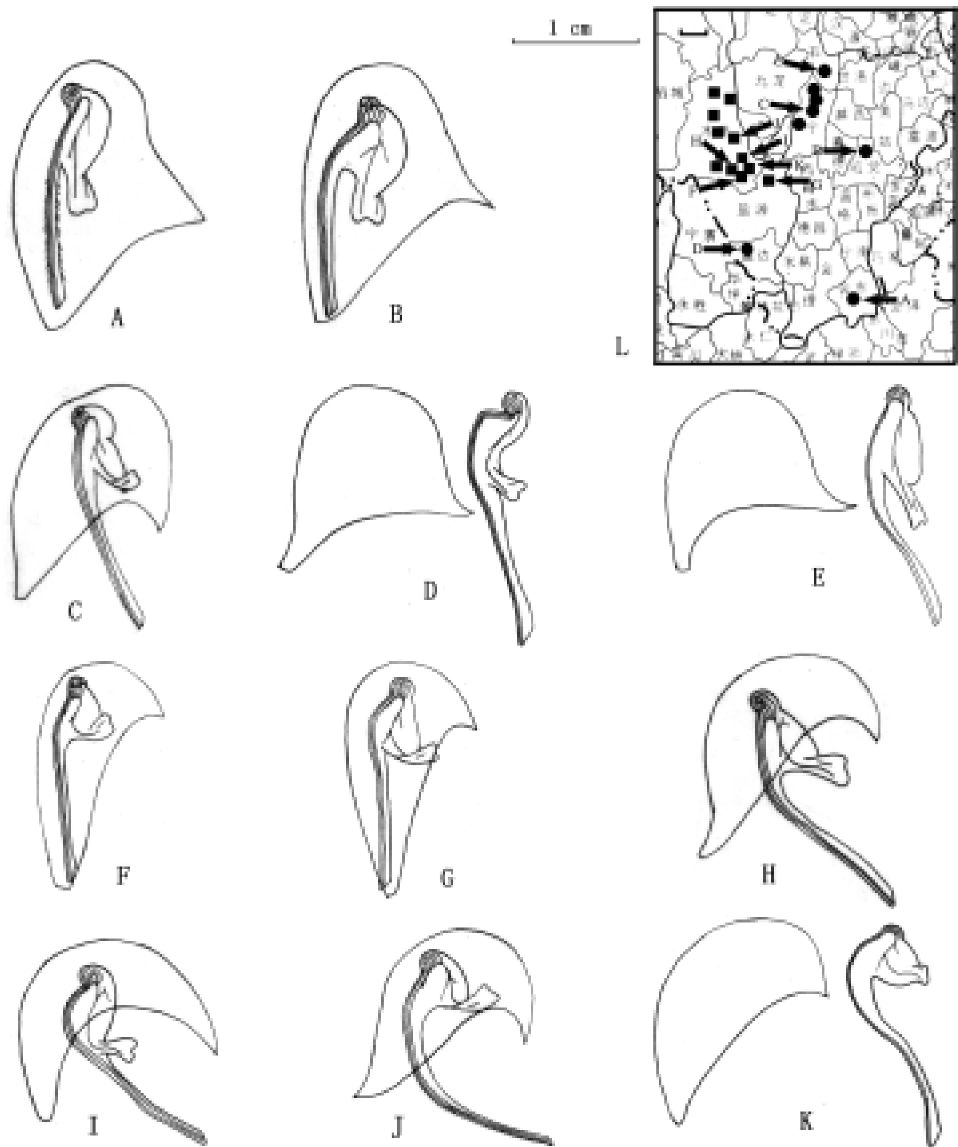


图21 来自不同居群的冕宁乌头(A-E)和它的变种低盔冕宁乌头(F-K)在不同地域上萼片和花瓣的变异式样 **A.** 四川会东,实验材料No. 20 (M)。**B.** 四川昭觉,李传仕无号(PE)。**C.** 四川冕宁,四川中药材站s.n. (PE)。**D.** 四川盐边,盐边队0418 (MS)。**E.** 四川石棉,郭平88-011 (PE)。**F.** 四川木里,武素功3608 (PE)。**G.** 四川盐源,盐源队606 (PE)。**H.** 四川木里,俞德浚14343 (PE)。**I.** 四川木里,赵清盛等8504(PE)。**J.** 四川木里,杨亲二93014 (PE)。**K.** 四川木里,青藏队13660 (PE)。**L.** 冕宁乌头和低盔冕宁乌头的分布。箭头所指居群对应于图中编号,标尺为50 km。

Fig. 21. Geographical variation in the shape of the upper sepal and of petal in *Aconitum legendrei* (A-E) and its variety var. *albovillosum* (F-K). **A,** Huidong, Sichuan, Experimental Material No. 20 (M). **B,** Zhaojue, Sichuan, C. S. Li s.n. (PE). **C,** Mianning, Sichuan, Sichuan Med. Stat. s.n. (PE). **D,** Yanbian, Sichuan, Yanbian Division 0418 (MS). **E,** Shimian, Sichuan, P. Guo 88-011 (PE). **F,** Muli, Sichuan, S. K. Wu 3608 (PE). **G,** Yanyuan, Sichuan, Yanyuan Division 606 (PE). **H,** Muli, Sichuan, T. T. Yu 14343 (PE). **I,** Muli, Sichuan, C. S. Zhao et al. 8504 (PE). **J,** Muli, Sichuan, Q. E. Yang 93014 (PE). **K,** Muli, Sichuan, Qinghai-Xizang Exped. 13660 (PE). **L,** Distribution of *Aconitum legendrei* var. *legendrei* and var. *albovillosum*. The populations are marked with arrows and correspond to those shown in figures A-K. Scale = 50 km.

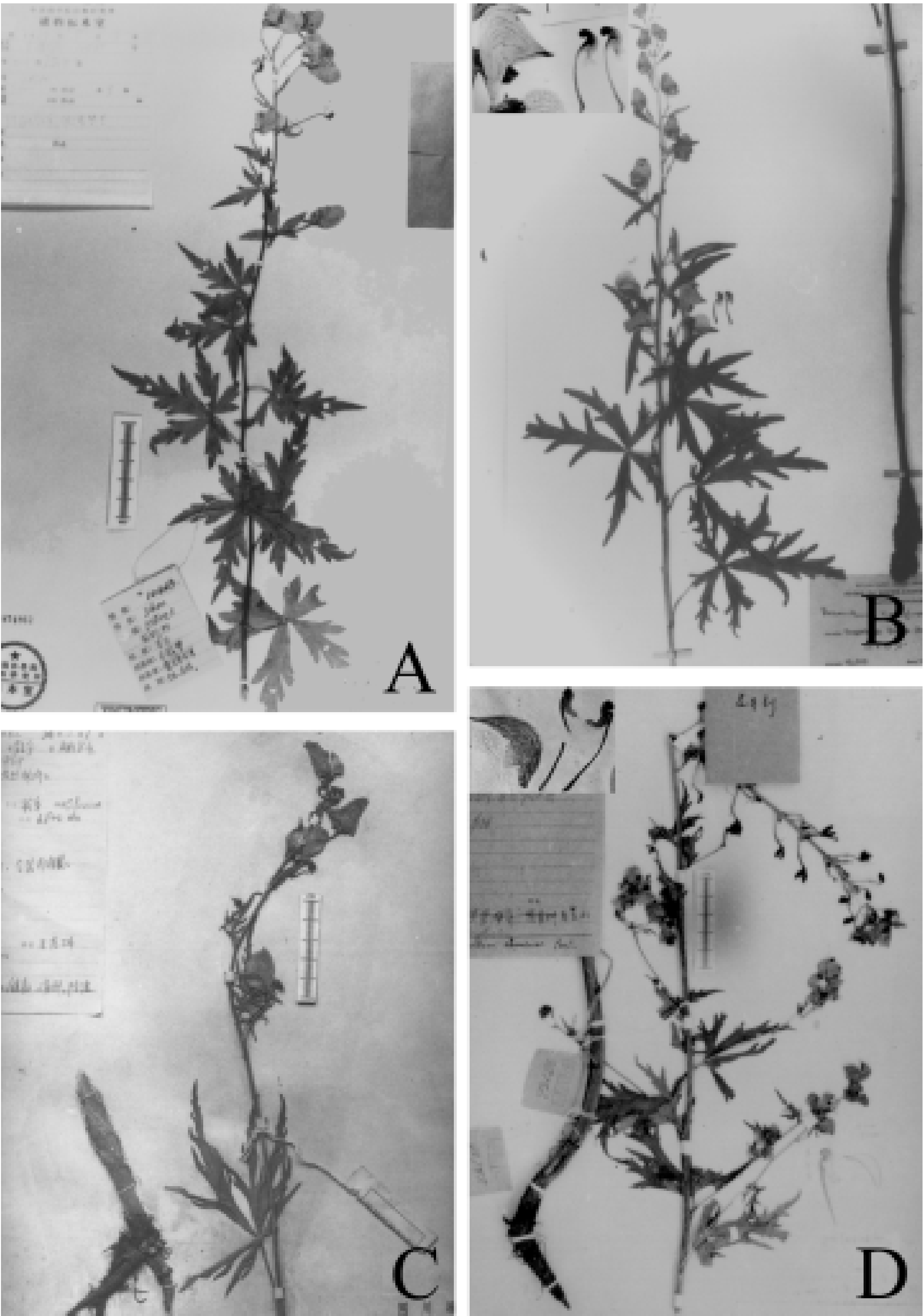


图22　**A-C**. 工布乌头　**A.** 四川马尔康,李谱雄10469 (PE, *Aconitum chuosjiaense* W. T. Wang的主模式)。**B.** 西藏工布江达, Ludlow et al. 6831 (E,等模式)。**C.** 四川丹巴,四川植被调查队5781 (PE, *A. chienningense* W. T. Wang的主模式)。**D.** 贡嘎乌头,四川马尔康,钟明芳22786 (PE, *A. liljestrandii* var. *falcatum* W. T. Wang的等模式)

Fig. 22.　**A-C,** *Aconitum kongboense* Lauener.　**A,** Barkam, Sichuan, P. X. Li 10469 (PE, holotype of *A. chuosjiaense* W. T. Wang). **B,** Gongbo'gyamda, Xizang, Ludlow et al. 6831 (E, isotype). **C,** Danba, Sichuan, Sichuan Veg. Exped. 5781 (PE, holotype of *A. chienningense* W. T. Wang). **D,** *A. liljestrandii* Hand.-Mazz., Barkam, Sichuan, M. F. Zhong 22786 (PE, isotype of *A. liljestrandii* var. *falcatum* W. T. Wang).

A. tsangpoense Lauener in l.c. 25: 16, figs. 1M, 4A. Type: China. Xizang (西藏): Tsangpo, in alpine pastures amongst shrubs and in open yak meadows, alt. 3650-3960 m, 1935-09-03, Kingdon-Ward 12301 (holotype, BM!).

A. viridiflorum Lauener in l.c. 25: 23, figs. 3G, 4H. Type: China. Xizang (西藏): Gongbo'gyamda (工布江达), on cliffs, alt. 4420 m, 1947-09-04, Ludlow et al. 14487 (holotype, BM!).

A. chuosjiaense W. T. Wang in Fl. Reip. Pop. Sin. 27: 607. 1979; et in l.c. 27: 230, fig. 17. 1979; L. Q. Li & Kadota in Fl. China 6: 188. 2001, syn. nov. Type: China. Sichuan (四川): Jinchuan (金川), in *Abies* woods, alt. 3400 m, 1958-08-13, P. X. Li (李谱雄) 10469 (holotype, PE!).

A. chienningense W. T. Wang in l.c. 27: 609. 1979; et in l.c. 27: 285, pl. 64, figs. 1-5. 1979; L. Q. Li & Kadota in Fl. China 6: 207. 2001, syn. nov. Type: China. Sichuan (四川): Danba (丹巴), in *Quercus* shrub, alt. 3900 m, 1978-08-07, Sichuan Veg. Exped. (四川植被队) 5781 (holotype, PE!).

多年生草本,高60-180 cm。块根长圆形。茎被反曲而贴伏的短柔毛。叶片圆五角形,三全裂或近全裂至基部,中央全裂片狭菱形,羽状深裂,末回裂片狭披针形,两面无毛或沿脉疏被短柔毛;最下部叶柄与叶片近等长,其他的则比叶片短。总状花序顶生,轴和花序密被反曲的短柔毛,或被开展柔毛;下部苞片叶状,其他苞片披针形或钻形;花梗长1-5 cm;小苞片生花梗中部之上或中部附近;萼片白色、淡紫色或蓝紫色。外面有少数短柔毛,上萼片盔形,稍高,有时船状盔形,高1.5-2 cm,下缘凹,长1.2-1.5 cm;花瓣疏被柔毛,距长约2 mm,向后反曲;雄蕊无毛,花丝全缘;心皮3-5,无毛或疏被白色短柔毛。花期8-9月。

分布:四川西部,西藏东部。

33a. 工布乌头 原变种

var. **kongboense**

本变种的花序轴和花梗密被反曲的短柔毛。

分布:四川西部,西藏东部。

Sichuan (四川): Batang (巴塘), K. Y. Lang et al. (郎楷永等) 2356; Danba (丹巴), Sichuan Veg. Exped. (四川植被队) 5781, Sichuan Med. Inst. (四川中药研究所) 44 (MS); Daocheng (稻城), Sichuan Veg. Exped. (四川植被队) 376 (CDBI), 3727 (PE, CDBI), Anonymous 764 (MS); Dawu (道孚), Sichuan Veg. Exped. (四川植被队) 5876 (PE, CDBI), Sichuan Med. Pl. Exped. (四川药源队) 15601 (MS, NAS), Y. Luo & Y. B. Luo (罗艳,罗毅波) 353; Garzê (甘孜), T. L. Dai & G. H. Tang (戴天伦,汤国华) s.n. (MS); Jinchuan (金川), P. X. Li (李谱雄) 10433, 10469; Kangding (康定), K. C. Kuan & W. T. Wang (关克俭,王文采) 1184, Y. Luo & Y. B. Luo (罗艳,罗毅波) 354; Luhuo (炉霍), Survey Exped. (普查队) 121 (MS); Muli (木里), Rock 16800 (E), Q. S. Zhao (赵清盛) 6568 (CDBI, SZ). **Xizang** (西藏): Cona (错那), C. Y. Wu et al. (吴征镒等) 75-1122; Gongbo'gyamda (工布江达), Ludlow et al. 6831 (BM, E), 1448 (BM), Qinghai-Xizang Exped. (青藏队) 7385 (KUN), Y. T. Chang & K. Y. Lang (张永田,郎楷永) 1379 (PE, KUN), Y. T. Chang & K. Y. Lang (张永田,郎楷永) 1411;

Lhasa (拉萨), G. S. Liu (刘国声) 4 (M), Ludlow et al. 9880 (BM); Lhünzhub (林周), Xizang Med. Pl. Exped. (西藏中草药普查队) 1970; Maizhokunggar (墨竹工卡), L. Dong et al. (董林等) s.n.; Nang Xian (朗县), Xizang Med. Pl. Exped. (西藏中草药普查队) 4248, 4509; Nyingchi (林芝), C. Y. Wu et al. (吴征镒等) 75-1170 (PE, KUN), Y. T. Chang & K. Y. Lang (张永田,郎楷永) 1343, Supplementary Qinghai-Xizang Exped. (青藏补点组) 750870 (KUN); Without precise locality, P. C. Tsoong (钟补求) 7148.

本种的叶通常为全裂或裂至近基部,裂片的形态有一定的变化(图22:A-C),裂片通常较细,有时极细。

33b. 展毛工布乌头

var. **villosum** W. T. Wang in Fl. Reip. Pop. Sin. 27: 609. 1979; et in l.c. 27: 288. 1979; L. Q. Li & Kadota in Fl. China 6: 208. 2001. Type: China. Sichuan (四川): Daocheng (稻城), 1964-08-02, Sichuan Med. Inst. (四川中药研究所) s.n. (holotype, MS!).

与原变种的区别在于花序轴和花梗被开展柔毛。

分布: 四川西南部,西藏东部。

Sichuan (四川): Daocheng (稻城), Sichuan Med. Inst. (四川中药研究所) s.n. (MS), Sichuan Veg. Exped. (四川植被队) 376 (CDBI); Jiulong (九龙), B. C. Ni (倪炳炽) 20949 (CDBI); Xiangcheng (乡城), Qinghai-Xizang Exped. (青藏队) 4617. **Xizang** (西藏): Mainling (米林), Xizang Med. Pl. Exped. (西藏中草药普查队) 3968。

34. 毛瓣乌头

Aconitum pilopetalum W. T. Wang & L. Q. Li in Acta Phytotax. Sin. 25: 30, pl. 2, fig. 4, 1987; L. Q. Li & Kadota in Fl. China 6: 211. 2001. Type: China. Sichuan (四川): Yajiang (雅江), in alpine scrub, alt. 4200 m, 1976-08-07, Anonymous 825 (holotype, KUN!).

多年生草本,高40-120 cm。块根长圆形。茎被伸展的短柔毛,分枝或不分枝。茎下部叶具长柄,在开花时枯萎;茎中部叶具短柄;叶片五角形,长4-5.5 cm,宽4-8 cm,三全裂,中央全裂片宽菱形,近羽状深裂,末回裂片条形或狭卵形;表面疏被短柔毛,下面沿脉疏被短柔毛;叶柄长约3 cm,疏被开展的短柔毛。顶生总状花序长8-16 cm,有多数密集的花;花序轴和花梗密被开展的短柔毛;下部苞片叶状,上部的披针状条形;花梗长0.5-3 cm;小苞片生花梗中部,线形;萼片深紫色,外面被短柔毛,上萼片低盔形或船状盔形,高1-1.2 cm,下缘近直,长1.2-1.5 cm;花瓣被短柔毛,距长约1.5 mm,向后弯曲;雄蕊无毛,花丝全缘;心皮5,无毛。花期8-9月。

分布:四川雅江一带。

Sichuan (四川): Yajiang (雅江), Anonymous 825 (KUN), Y. B. Luo (罗毅波) 93, Y. Luo & Y. B. Luo (罗艳,罗毅波) 355, 361, 364, 369, 376。

本种在雅江很常见,上萼片的形状有变化,有时稍高成盔形,有时稍低成船状盔形(图23)。通常生长于林下或灌丛。

35. 贡嘎乌头

Aconitum liljestrandii Hand.-Mazz. in Acta Hort. Gotob. 13: 108. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 303, pl. 70, figs. 7-10. 1979; L. Q. Li & Kadota in Fl. China 6: 215.

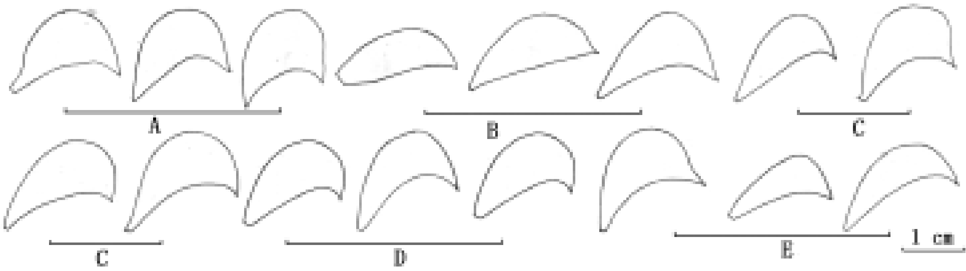


图23 毛瓣乌头的上萼片在居群间和居群内的变化 **A.** 四川雅江,罗艳,罗毅波355 (PE)。**B.** 四川雅江,罗艳,罗毅波361 (PE)。**C.** 四川雅江,罗艳,罗毅波369 (PE)。**D.** 四川雅江,罗艳,罗毅波364(PE)。**E.** 四川雅江,罗艳,罗毅波376 (PE)。
Fig. 23. Inter- and intra- population variation in the upper sepal of *Aconitum pilopetalum*. **A,** Yajiang, Sichuan, Y. Luo & Y. B. Luo 355 (PE). **B,** Yajiang, Sichuan, Y. Luo & Y. B. Luo 361 (PE). **C,** Yajiang, Sichuan, Y. Luo & Y. B. Luo 369 (PE). **D,** Yajiang, Sichuan, Y. Luo & Y. B. Luo 364 (PE). **E,** Yajiang, Sichuan, Y. Luo & Y. B. Luo 376 (PE).

2001. Type: China. Sichuan (四川): eastern slope of Mt. Gonggashan (贡嘎山东部), 1922-08-19, Liljestrand 106, 107 (syntypes).

A. liljestrandii var. *falcatum* W. T. Wang in Fl. Reip. Pop. Sin. 27: 610. 1979; et in l.c. 27: 303, pl. 68, fig. 4; pl. 74, fig. 1. 1979; L. Q. Li & Kadota in Fl. China 6: 215. 2001, syn. nov. Type: China. Sichuan (四川): Barkam (马尔康), in shrub, alt. 3800 m, 1960-08-12, M. F. Zhong (钟明芳) 22786 (holotype, MS!; isotypes, PE!, M!).

多年生草本,高60-160 cm。块根长圆形。茎上被开展的白色短柔毛。茎下部叶有长柄,在开花时枯萎,茎中部叶有稍长柄;叶片圆五角形,长4-5.5 cm,宽4-8 cm,三全裂或裂至近基部,中央全裂片菱形或狭菱形,羽状深裂,末回裂片条形,两面无毛或沿脉疏被短柔毛;叶柄长2-3 cm,疏被开展毛。总状花序长10-20 cm,有密集的花,有时有分枝,分枝上的花通常较小;轴和花梗密被白色开展的短柔毛;下部苞片叶状,上部的线形;花梗长1-5 cm;小苞片生花梗中部或上部,条形或线形;萼片蓝紫色,外面无毛,上萼片船形或镰形,高0.3-0.7 cm,自基部至喙长1.5-2.2 cm,下缘凹或近直斜向上展;花瓣疏被短柔毛,爪顶端有时膝状弯曲,距长约2 mm,向后弯曲;雄蕊无毛,花丝全缘;心皮3-5,无毛。花期7-8月。

分布:四川西部。

35a. 贡嘎乌头 原变种

var. **liljestrandii**

本变种花较大,上萼片船形,下缘近直。

分布:四川西部。

Sichuan (四川): Barkam (马尔康), P. X. Li (李谱雄) 10547, M. F. Zhong (钟明芳) 22786 (PE, M); Dawu (道孚), Smith 11737; Jinchuan (金川), H. Li (李馨) 77966 (NAS), 78161 (PE, NAS), Anonymous 9951, The 8th Forest Management Brigade (第八森林经理大队) 3503 (SZ), Y. Luo & Y. B. Luo (罗艳,罗毅波) 344; Xiaojin (小金), S. S. Chang & Y. X. Ren (张秀实,任有铣) 6560 (PE, CDBI), S. S. Chang et al. (张秀实等) 6899 (SZ), Sichuan Veg. Exped. (四川植被队) 9725 (PE, CDBI), Z. G. Liu (刘照光) 392 (CDBI).

采自马尔康的钟明芳22786(图22:D)为*A. liljestrandii* var. *falcatum*的模式,上萼片稍低,

但形态与贡嘎乌头一致,属于该种的变异范围,因此也将其置于本种内。

35b. 刷经寺乌头 变种 图24

var. **fangianum** (W. T. Wang) Y. Luo & Q. E. Yang, stat. et com. nov.

A. fangianum W. T. Wang in Acta Phytotax. Sin. Addit. 1: 88, pl. 5, fig. 18. 1965; W. T. Wang in Fl. Reip. Pop. Sin. 27: 301, pl. 69, figs. 1-6. 1979; L. Q. Li & Kadota in Fl. China 6: 215. 2001. Type: China. Sichuan (四川): Hongyuan (红原), alt. 4200 m, 1957-08-21, H. Li & C. H. Chow (李馨,周继西) 74113 (holotype, SZ!; isotypes, PE!, SZ!, NAS!).

A. lihsienense W. T. Wang in Fl. Reip. Pop. Sin. 27: 607. 1979; et in l.c. 27: 229. 1979; L. Q. Li & Kadota in Fl. China 6: 187. 2001, syn. nov. Type: China. Sichuan (四川): Li Xian (理县), in forest, alt. 3300 m, 1956-07-16, W. G. Hu (胡文光) 825 (holotype, SZ!; isotype, SZ!).

A. leiostachyum W. T. Wang in Fl. Reip. Pop. Sin. 27: 609. 1979; et in l.c. 27: 291, pl. 62, fig. 10, pl. 65, figs. 6-8. 1979; L. Q. Li & Kadota in Fl. China 6: 209. 2001, syn. nov. Type: China. Sichuan (四川): Li Xian (理县), alt. 2720 m, 1958-07-17, M. F. Zhong (钟明芳) 5560 (holotype, MS!; isotypes, MS!, SZ!).

A. longiramosum W. T. Wang in Fl. Reip. Pop. Sin. 27: 607. 1979; et in l.c. 27: 232, pl. 46, figs. 1, 2. 1979; L. Q. Li & Kadota in Fl. China 6: 189. 2001, syn. nov. Type: China. Sichuan (四川): Li Xian (理县), alt. 3700 m, 1957-09-03, H. Li (李馨) 74405 (holotype, PE!; isotypes, SZ!, NAS!).

A var. *liljestrandii* differt floribus minoribus, sepalo superiore falcato, margine infero concavo.

与原变种的区别是花小,上萼片镰形,下缘凹。在原变种,花相对较大,上萼片船形,下缘近直。

分布:四川西部。

Sichuan (四川): Hongyuan (红原), H. Li & C. H. Chow (李馨,周继西) 74113 (PE, SZ, NAS), Y. Luo & Y. B. Luo (罗艳,罗毅波) 334, 340, 342; Li Xian (理县), M. F. Zhong (钟明芳) 5560 (MS, SZ), W. G. Hu (胡文光) 825 (SZ), H. Li (李馨) 74405, Y. Luo & Y. B. Luo (罗艳,罗毅波) 310, 316, 324。

位于四川省西北部的理县、红原和马尔康交界的鹧鸪山附近的地区分布有很多乌头属植物。自1965年以来,该地就发表了4个分类群。我们查看这些类群的标本时,发现这些种的外部形态都很相近,叶三全裂或近全裂,上萼片镰形,仅花梗毛被有变化。刷经寺乌头 *A. fangianum* W. T. Wang(图24:C)、理县乌头*A. lihsienense* W. T. Wang(图24:A)、光序乌头*A. leiostachyum* W. T. Wang(图24:B)是花梗无毛的类型,长枝乌头*A. longiramosum* W. T. Wang(图24:D)则是花梗毛被开展的类型。在这样一个狭小的区域分布有如此多的近缘类型,不由引起了我们的兴趣。于是我们对该地进行了详细的野外调查,对在此分布的6个居群主要进行了花梗毛被性状的考察(图25)。我们发现花梗毛被在居群内变化很大,在310居群中,多数植株花序轴和花梗无毛,但也存在被卷曲毛的个体;316的居群中,花梗无毛、花梗被开展毛和花梗被卷曲毛的个体都有;也有居群内的全部个体都一致的情况,如在刷经寺的334居群,花梗都被卷曲毛,而340都被开展毛。鉴于上述居群中花梗毛被的变化,鹧鸪

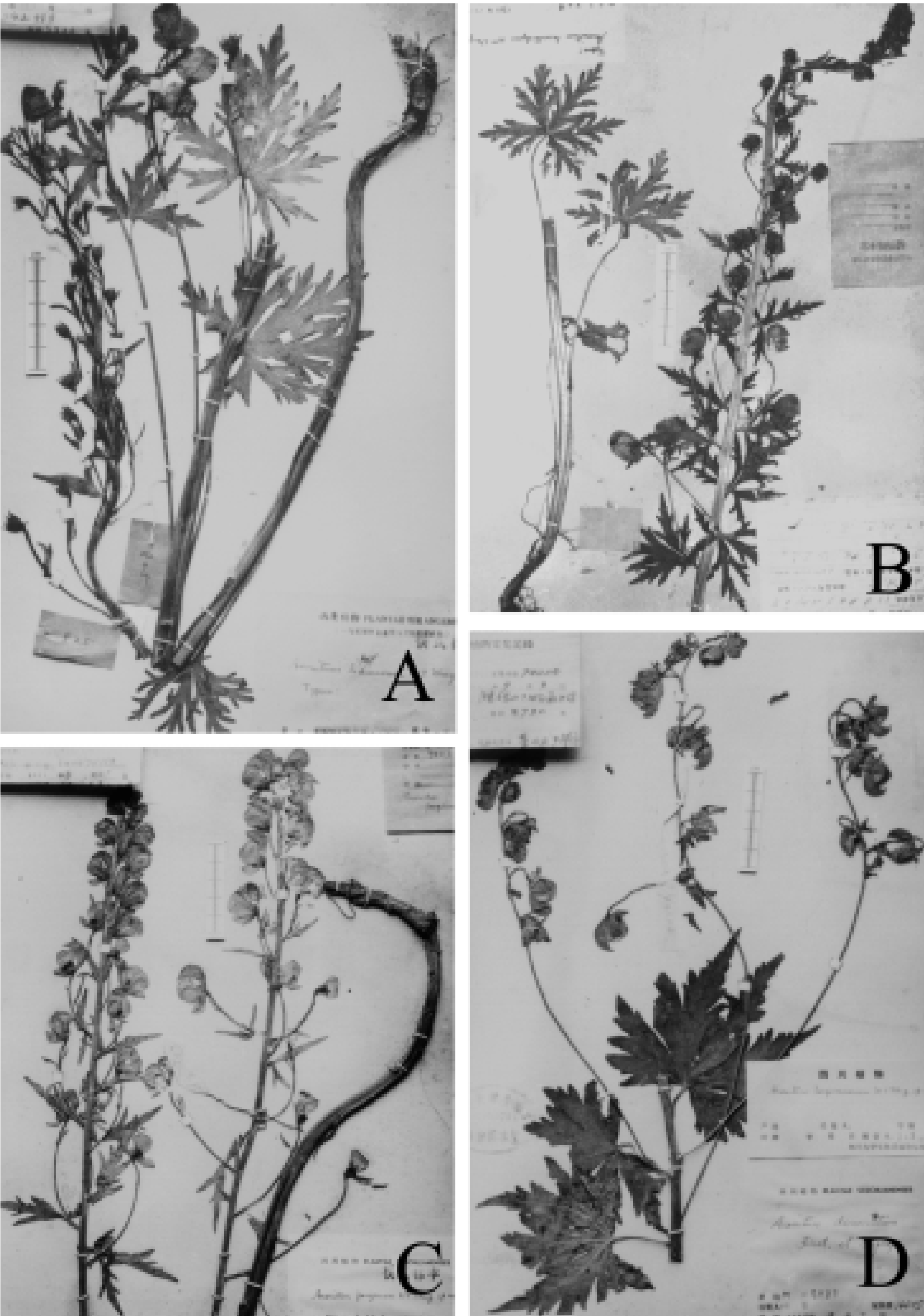


图24 刷经寺乌头 **A.** 四川理县,胡文光825(SZ, *Aconitum lihsienense* W. T. Wang的主模式)。**B.** 四川理县,钟明芳5560 (MS, *A. leiostachyum* W. T. Wang的主模式)。**C.** 四川理县,李馨,周继西74113(SZ, *A. fangianum* W. T. Wang的主模式)。**D.** 四川理县,李馨74405 (SZ, *A. longiramosum* W. T. Wang的等模式)。

Fig. 24. *Aconitum liljestrandii* var. *fangianum* (W. T. Wang) Y. Luo & Q. E. Yang. **A,** Li Xian, Sichuan, W. G. Hu 825 (SZ, holotype of *A. lihsienense* W. T. Wang). **B,** Li Xian, Sichuan, M. F. Zhong 5560 (MS, holotype of *A. leiostachyum* W. T. Wang). **C,** Li Xian, Sichuan, H. Li & C. H. Chow 74113 (SZ, holotype of *A. fangianum* W. T. Wang). **D,** Li Xian, Sichuan, H. Li 74405 (SZ, isotype of *A. longiramosum* W. T. Wang).

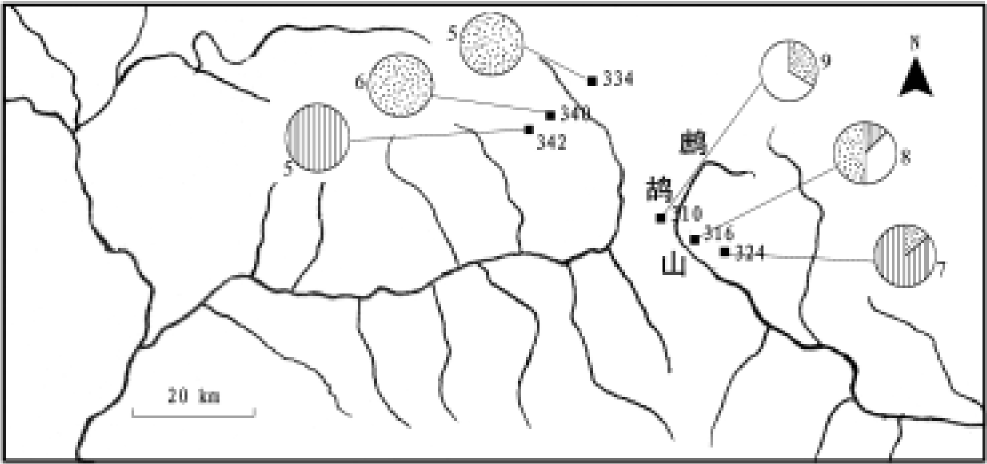


图25　四川西部鹧鸪山刷经寺乌头在六个居群中花梗毛被的变化　饼图中,空白表示花梗无毛,阴影线表示花梗被卷曲毛,星点表示花梗被开展毛。310, 理县米亚罗鹧鸪山垭口,海拔4100 m; 316, 理县米亚罗鹧鸪山道班,海拔3900 m; 324, 理县米亚罗滑雪场,海拔3700 m; 334, 红原县刷经寺石灰窑沟,海拔3500 m; 340, 红原县刷经寺正沟,海拔3500 m;342, 红原县刷经寺正沟,海拔4000 m。饼图旁的数字为每个居群所调查的个体数。

Fig. 25. Variation in the pedicel pubescence of six populations of *Aconitum liljestrandii* var. *fangianum* from Mt. Zhegushan, NW Sichuan. Open area: pedicel glabrous. Hatched area: pedicel villose with curved hairs. Dotted area: pedicel villose with spreading hairs. 310, Yakou, Mt. Zhegushan, Miyaluo, Li Xian, alt. 4100 m; 316, Zhegushan Daoban, Miyaluo, Li Xian, alt. 3900 m; 324, Skiing yard, Miyaluo, Li Xian, alt. 3700 m; 334, Shihuiyaogou, Shuajingsi, Hongyuan, alt. 3500 m; 340, Zhenggou, Shuajingsi, Hongyuan, alt. 3500 m; 342, Zhenggou, Shuajingsi, Hongyuan, alt. 4000 m. Numbers beside each pie chart indicate the number of individuals examined.

山一带描述的种——刷经寺乌头、理县乌头、光序乌头和长枝乌头的存在令人质疑。根据描述以及标本,长枝乌头的茎蔓生,叶掌状深裂,深裂片尾状渐尖,易与其他种区别,但根据我们的野外观察,匍匐茎和叶片深裂片尾状渐尖等形态与生长环境密切相关,在310和324居群中有几份标本就有这种形态。

从这些植物的形态特征,如叶近全裂、上萼片较低来看,它们无疑与贡嘎乌头的关系较近。典型的贡嘎乌头的花要比鹧鸪山复合群的大,并且它们的上萼片的形态也稍有区别,贡嘎乌头的上萼片下缘直,故上萼片为船形(图26:A-D),鹧鸪山复合群的下缘呈弧形,故上萼片为船状镰形(图26:E-I)。基于鹧鸪山复合群与贡嘎乌头的关系,我们认为将其处理为贡嘎乌头的变种为宜。据优先律,我们采用了*fangianum*作为变种加词,即将*A. fangianum*降为变种,而其他名称*A. lihsienense*、*A. leiostachyum*和*A. longiramosum*都降为其异名。

36. 东俄洛乌头　图27

Aconitum tongolense Ulbr. in Rep. Sp. Nov. 14: 299. 1915; Hand.-Mazz. in Acta Hort. Gotob. 13: 95. 1939. Type: China. Sichuan (四川): Kangding (康定), 1894-08, Soulié 2395.

A. napellus L. var. *polyanthum* Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 513. 1904. ——*A. polyanthum* (Finet & Gagnep.) Hand.-Mazz. in Acta Hort. Gotob. 13: 99. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 204. 1950; L. Q. Li & Kadota in Fl. China 6: 209. 2001, syn. nov. Type: China. Sichuan (四川): Kangding (康定), 1891-08, Soulié 21 (syntype, P!); the same locality, 1893-09, Soulié 231 (syntype, P!); the same locality, 1893-09,

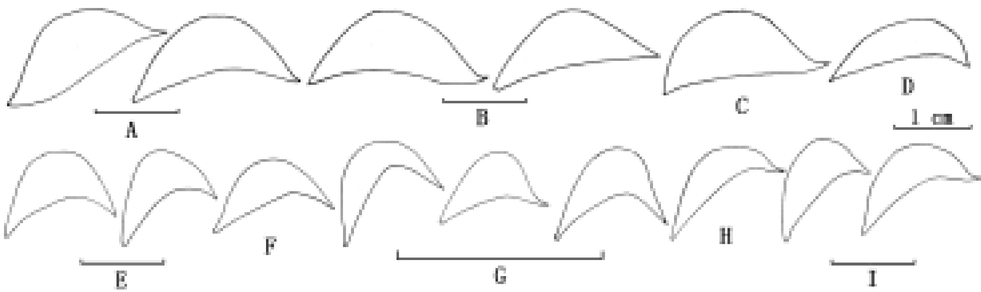


图26 采自不同居群的贡嘎乌头(原变种)(上一行)与其变种刷经寺乌头(下一行)上萼片形状的比较 **A.** 四川金川,罗艳,罗毅波344 (PE)。**B.** 四川小金, 四川植被队9725 (PE)。**C.** 四川道孚, Smith 11737 (PE)。**D.** 四川马尔康, 钟明芳22786 (PE)。**E.** 四川理县, 罗艳,罗毅波310 (PE)。**F.** 四川红原,罗艳,罗毅波342 (PE)。**G.** 四川理县,罗艳,罗毅波316 (PE)。**H.** 四川红原,罗艳,罗毅波334 (PE)。**I.** 四川理县,罗艳,罗毅波324 (PE)。

Fig. 26. Comparison of the shape of the upper sepal of *Aconitum liljestrandii* (upper row) and its variety var. *fangianum* (lower row) based on materials from different populations. **A,** Jinchuan, Sichuan, Y. Luo & Y. B. Luo 344 (PE). **B,** Xiaojin, Sichuan, Sichuan Veg. Exped. 9725 (PE). **C,** Dawu, Sichuan, Smith 11737 (PE). **D,** Barkam, Sichuan, M. F. Zhong 22786 (PE). **E,** Li Xian, Sichuan, Y. Luo & Y. B. Luo 310 (PE). **F,** Hongyuan, Sichuan, Y. Luo & Y. B. Luo 342 (PE). **G,** Li Xian, Sichuan, Y. Luo & Y. B. Luo 316 (PE). **H,** Hongyuan, Sichuan, Y. Luo & Y. B. Luo 334 (PE). **I,** Li Xian, Sichuan, Y. Luo & Y. B. Luo 324 (PE).

Soulié 231A (syntype, P!); the same locality, 1894-08-13, Soulié 2393 (syntype, P!); the same locality, 1894-08-13, Soulié 2394 (syntype, P!).

多年生草本,高30-120 cm。块根胡萝卜形。茎一般为紫色,疏被反曲的短柔毛。茎下部叶在开花时枯萎,茎中部叶有稍长柄;叶片五角形,长5-7.5 cm,宽5-10 cm,基部心形,三全裂,裂片细,中央裂片菱形,近羽状深裂,末回裂片线形或披针形,两面无毛;叶柄长2-5.5 cm,疏被开展的短柔毛。总状花序顶生,有多数密集的花,有时花序下部有小分枝; 花序轴和花梗密被白色反曲的短柔毛;下部苞片叶状,上部的线形;花梗长0.8-2 cm;小苞片生花梗中部,线形;萼片蓝紫色,外面无毛,上萼片船形,高0.7-0.9 cm,自基部至喙长1-1.5 cm,下缘弧状凹陷;花瓣被毛,距长约1 mm;雄蕊无毛,花丝全缘;心皮3-4,子房无毛。花期7-9月。

分布:四川康定一带。

Sichuan (四川): Kangding (康定), Soulié 21, 231, 231A, 2393, 2394 (P), Cunningham 315 (E), K. C. Kuan & W. T. Wang (关克俭,王文采) 979, Y. Luo & Y. B. Luo (罗艳,罗毅波) 374, 375, 378, 380。

本种是Ulbrich根据J. A. Soulié采自四川康定东俄洛一带的标本(Soulié 2395)描述的种,很遗憾我们没有查看到。本种在过去的记载中,被认为广泛分布于四川西部和西南部、云南西北部和西藏东部。我们查看了大量标本并进行了野外观察,发现分布于康定一带的植物和分布于巴塘、稻城以及云南和西藏的植物在上萼片的形状和子房毛被方面有差别,分布于康定的植物上萼片高,子房无毛,而巴塘、稻城一带的植物上萼片较矮,子房被毛 (图28)。我们根据其模式产于康定东俄洛以及原始描述认为康定一带产的可能应该是真正的东俄洛乌头,因此将这些植物分为两类,即分布于康定者是真正的*A. tongolense*,而巴塘、稻城分布者是*A. refractum* (Finet & Gagnep.) Hand.-Mazz.(见下面的分类处理)。另外*A. polyanthum*是Finet和Gagnepain根据Soulié采自康定东俄洛的标本(Soulié 21, 231, 231A, 2393, 2394)(图27)建立的变种*A. napellus* var. *polyanthum*,后来被Handel-Mazzetti提升为种

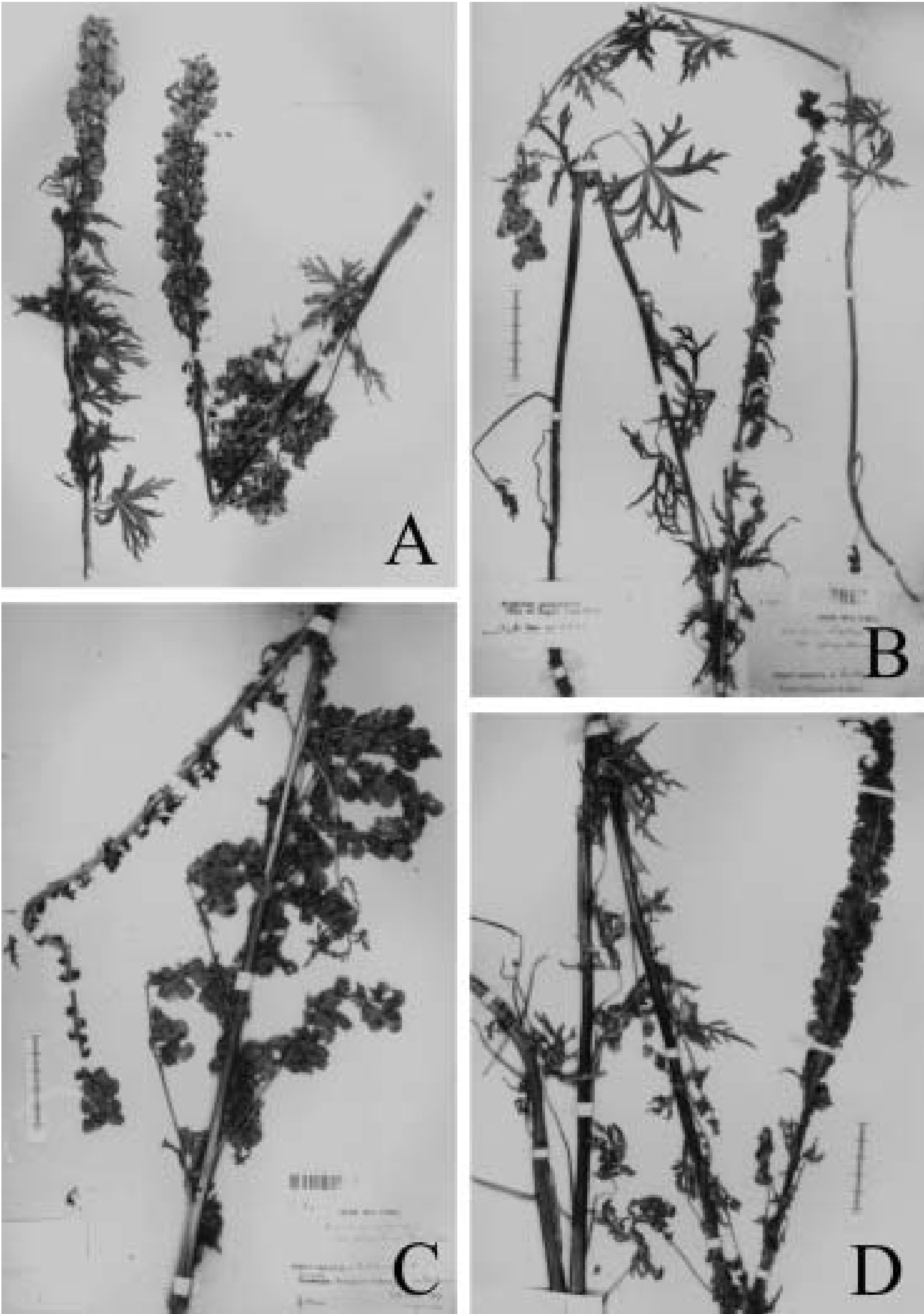


图27　东俄洛乌头　**A.** 四川康定, Cunningham 315 (E)。**B.** 四川康定, Soulié 2393 (P, *Aconitum napellus* var. *polyanthum* Finet & Gagnep.的合模式)。**C.** 四川康定, Soulié 231A (P, *A. napellus* var. *polyanthum* Finet & Gagnep.的合模式)。**D.** 四川康定, Soulié 2394 (P, *A. napellus* var. *polyanthum* Finet & Gagnep.的合模式)。

Fig. 27. *Aconitum tongolense* Ulbr. **A,** Kangding, Sichuan, Cunningham 315 (E). **B,** Kangding, Sichuan, Soulié 2393 (P, syntype of *A. napellus* var. *polyanthum* Finet & Gagnep.). **C,** Kangding, Sichuan, Soulié 231A (P, syntype of *A. napellus* var. *polyanthum* Finet & Gagnep.). **D,** Kangding, Sichuan, Soulié 2394 (P, syntype of *A. napellus* var. *polyanthum* Finet & Gagnep.).

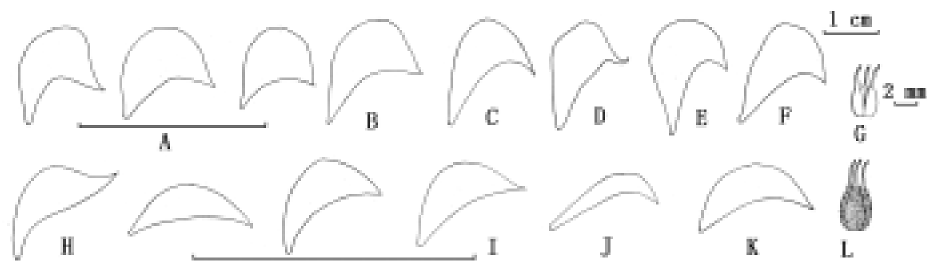


图28 东俄洛乌头(上一行)和狭裂乌头(下一行)上萼片形状和子房的比较 **A.** 四川康定,罗艳,罗毅波374 (PE)。**B.** 四川康定,罗艳,罗毅波378 (PE)。**C.** 四川康定,罗艳,罗毅波380 (PE)。**D.** 四川康定,Soulié 21 (P)。**E.** 四川康定, Soulié 231 (P)。**F.** 四川康定,Soulié 231A (P)。**G.** 四川康定,罗艳,罗毅波378 (PE)。**H.** 四川乡城,罗艳,罗毅波416 (PE)。**I.** 四川稻城,罗艳,罗毅波406 (PE)。**J.** 四川巴塘,Soulié 3037 (P)。**K.** 四川巴塘,Soulié 3035 (P)。**L.** 四川稻城,罗艳,罗毅波406 (PE)。

Fig. 28. Comparison of the shape of the upper sepal and of the carpel pubescence of *Aconitum tongolense* (upper row) and *A. refractum* (lower row) based on materials from different populations. **A,** Kangding, Sichuan, Y. Luo & Y. B. Luo 374 (PE). **B,** Kangding, Sichuan, Y. Luo & Y. B. Luo 378 (PE). **C,** Kangding, Sichuan, Y. Luo & Y. B. Luo 380 (PE). **D,** Kangding, Sichuan, Soulié 21 (P). **E,** Kangding, Sichuan, Soulié 231 (P). **F,** Kangding, Sichuan, Soulié 231A (P). **G,** Kangding, Sichuan, Y. Luo & Y. B. Luo 378 (PE). **H,** Xiangcheng, Sichuan, Y. Luo & Y. B. Luo 416 (PE). **I,** Daocheng, Sichuan, Y. Luo & Y. B. Luo 406 (PE). **J,** Batang, Sichuan, Soulié 3037 (P). **K,** Batang, Sichuan, Soulié 3035 (P). **L,** Daocheng, Sichuan, Y. Luo & Y. B. Luo 406 (PE).

的等级,我们查看了这些标本,形态特征与本种无明显区别,应该可以归入本种。

37. 狭裂乌头 图29

Aconitum refractum (Finet & Gagnep.) Hand.-Mazz. in Acta Hort. Gotob. 13: 108. 1939, p.p. excl. Soulié 2029; W. T. Wang in Fl. Reip. Pop. Sin. 27: 295, pl. 67, figs. 1-4. 1979; L. Q. Li & Kadota in Fl. China 6: 212. 2001. ——*A. napellus* L. var. *refractum* Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 513. 1904. Type: China. Sichuan (四川): Batang (巴塘), 1903-07, Soulié 3035 (lectotype, here designated, P!)

A. chenianum W. T. Wang in Acta Phytotax. Sin. Addit. 1: 89, pl. 6, fig. 22. 1965. Type: China. Sichuan (四川): Daocheng (稻城), alt. 3800 m, 1937-08-21, T. T. Yu (俞德浚) 12824 (holotype, PE!; isotype, KUN!).

A. polyanthum var. *puberulum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 89. 1965; W. T. Wang in Fl. Reip. Pop. Sin. 27: 291. 1979, syn. nov. Type: China. Xizang (西藏): Qamdo (昌都), alt. 4000 m, 1961-07-14, P. K. Hsiao & K. C. Hsia (肖培根,夏光成) 1680 (holotype, M; isotype, PE!)

A. bracteolosum W. T. Wang in Fl. Reip. Pop. Sin. 27: 610. 1979; et in l.c. 27: 305. 1979; L. Q. Li & Kadota in Fl. China 6: 215. 2001. Type: China. Yunnan (云南): Zhongdian (中甸), 1976-07-20, J. S. Yang (杨竞生) 8119 (holotype, PE!).

A. xiangchenense W. T. Wang in Acta Bot. Yunnan. 4: 130, fig. 1: figs. 1-4. 1982; L. Q. Li & Kadota in Fl. China 6: 212. 2001, syn. nov. Type: China. Sichuan (四川): Xiangcheng (乡城), in meadows under forest, alt. 3600 m, 1981-08-11, Qinghai-Xizang Exped. (青藏队) 4626 (holotype, PE!; isotype, CDBI!).



图**29** 狭裂乌头 **A.** 四川巴塘, Soulié 3035 (P,后选模式)。**B.** 四川巴塘, Soulié 3032 (P, 副模式)。**C.** 四川乡城, 青藏队4626 (PE, *Aconitum xiangchenense*的主模式)。**D.** 四川昌都, 肖培根,夏光成1680 (PE, *A. polyanthum* var. *puberulum*的等模式)。

Fig. 29. *Aconitum refractum* (Finet & Gagnep.) Hand.-Mazz. **A,** Batang, Sichuan, Soulié 3035 (P, lectotype). **B,** Batang, Sichuan, Soulié 3032 (P, paratype). **C,** Xiangcheng, Sichuan, Qinghai-Xizang Exped. 4626 (PE, holotype of *A. xiangchenense*). **D,** Qamdo, Sichuan, P. K. Hsiao & K. C. Hsia 1680 (PE, isotype of *A. polyanthum* var. *puberulum*).

A. gezäense W. T. Wang & L. Q. Li in Acta Phytotax. Sin. 25: 31, pl. 3, fig. 1. 1987. Type: China. Yunnan (云南): Zhongdian (中甸), alt. 4300 m, 1983-08-26, J. S. Yang (杨竞生) 83-396 (holotype, PE!).

A. kongboense var. *polycarpum* W. T. Wang in Acta Phytotax. Sin. 25: 33, pl. 3, fig. 4. 1987; L. Q. Li & Kadota in Fl. China 6: 208. 2001. Type: China. Yunnan (云南): Zhongdian (中甸), 1983-08-26, J. S. Yang (杨竞生) 83-407 (holotype, PE!).

A. tongolense auct. non Ulbr.: W. T. Wang in Acta Phytotax. Sin. Addit. 1: 85. 1965; et in Fl. Reip. Pop. Sin. 27: 305, pl. 70, figs. 1-4. 1979, p.p.; Q. E. Yang in Acta Phytotax. Sin. 37: 587. 1999; L. Q. Li & Kadota in Fl. China 6: 216. 2001, p.p.

多年生草本,高40-120 cm。块根胡萝卜形。茎疏被反曲的短柔毛。茎下部叶在开花时枯萎。茎中部叶有稍长柄;叶片五角形,长5.5-8 cm,宽5-8 cm,基部心形,三全裂或裂至近基部,中央全裂片卵状狭菱形,近羽状深裂,末回裂片狭披针形,表面疏被短伏毛,背面无毛;叶柄2-4 cm,疏被反曲的短柔毛。总状花序顶生,长20-30 cm,有多数小而密集的花;花序轴和花梗被反曲的短柔毛;下部苞片叶状三裂,上部苞片条形;花梗长0.5-4 cm;下部花梗的小苞片叶状,其他的狭线形或钻形;萼片蓝紫色,外面无毛或疏被短毛,上萼片镰形,高约0.5 mm,自基部至喙长1.5-2.3 cm,下缘稍凹;花瓣爪部密生短毛,距长约1 mm;雄蕊无毛,花丝全缘;心皮3-4,子房密被紧贴的短柔毛。花期7-9月。

分布: 四川西部,云南西北部,西藏东部。

Sichuan (四川): Batang (巴塘), Anonymous 1633, Soulié 3032, 3033, 3035, 3037, 3887 (P), Limpricht 2210 (WU), Sichuan Veg. Exped. (四川植被队) 1633, 1628 (PE, CDBI), G. Yao (姚淦) 357, 362, 599 (NAS); Daocheng (稻城), Sichuan Veg. Exped. (四川植被队) 1938, 2184, 2187, 3778, 3880 (PE, CDBI), T. T. Yu (俞德浚) 12824, Y. Luo & Y. B. Luo (罗艳,罗毅波) 406; Dêrong (得荣), Qinghai-Xizang Exped. (青藏队) 3438 (PE, CDBI); Xiangcheng (乡城), Sichuan Veg. Exped. (四川植被队) 1165, 1427, 3128 (PE, CDBI), Qinghai-Xizang Exped. (青藏队) 3846, 4863, 4626 (PE, CDBI), K. Y. Lang et al. (郎楷永等) 2645, Y. Luo & Y. B. Luo (罗艳,罗毅波) 416. **Yunnan** (云南): Dêqên (德钦), Kingdon-Ward 1006 (E); Zhongdian (中甸), J. S. Yang (杨竞生) 8333, 84-685 (KUN), J. S. Yang (杨竞生) 8119, 83-407, 84-687,88-136. **Xizang** (西藏): Mainling (米林), Xizang Med. Pl. Exped. (西藏中草药普查队) 3895; Qamdo (昌都), P. K. Hsiao & K. C. Hsia (肖培根,夏光成) 1680。

本种长期以来与东俄洛乌头混淆不清,以前许多分布于四川稻城、得荣以及云南和西藏的被鉴定为东俄洛乌头*A. tongolense*的植物其实不是真正的东俄洛乌头而应该属于本种。从对东俄洛乌头*A. tongolense*的讨论中(见上一种),我们已经知道了它们之间的区别。*A. refractum*是Handel-Mazzetti(1939)基于Finet和Gagnepain根据J. A. Soulié采自康定东俄洛的标本(Soulié 2029)和采自巴塘亚日贡的标本(Soulié 3032 (图29:B), 3033, 3035 (图29:A), 3037)建立的变种*A. napellus* L. var. *refractum*而提升到种的等级的,我们未查看到其中产于康定的Soulié 2029,但据Finet和Gagnepain(1904)和Handel-Mazzetti(1939)的描述,此份标本整个植株无毛,可能不属于本种,可能是康定分布的另外一个种——无毛乌头*A. glabrisepalum* W. T. Wang。乡城乌头*A. xiangchenense* (图29:C)在形态上与狭裂乌头没有

明显区别,王文采发表该种时也指出它与本种关系较近。但提及的区别性状如叶裂片形状、花瓣和雄蕊被毛情况,我们认为都属于本种的变异范围,所以乡城乌头就形态和地理分布来说,应该归入本种。

系**10.** 短柄乌头系

Ser. 10. **Brachypoda** W. T. Wang in Fl. Reip. Pop. Sin. 27: 313. 1979.

块根2。茎直立。基生叶通常不存在。中部以上叶较多而密集,有短柄或近无柄;叶片掌状全裂,一回裂片细裂。上萼片船状盔形、船形或镰刀形。花瓣的瓣片不膨大,有短距。

38. 短柄乌头

Aconitum brachypodum Diels in Not. Bot. Gard. Edinb. 5: 268. 1912; Hand.-Mazz., Symb. Sin. 7: 288. 1931; et in Acta Hort. Gotob. 13: 88. 1939; Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 199. 1950; W. T. Wang in Acta Phytotax. Sin. Addit. 1: 97. 1965; et in Fl. Reip. Pop. Sin. 27: 313, pl. 73, figs. 4-6; pl. 74, figs. 5, 6. 1979; Hsiao & W. T. Wang in Acta Pharm. Sin. 12: 690. 1965; Q. E. Yang in Acta Phytotax. Sin. 37: 588. 1999; L. Q. Li & Kadota in Fl. China 6: 219. 2001. Type: China. Yunnan (云南): Lijiang (丽江), in open grassy area on the margins of pine forests, alt. 3300-3600 m, 1906-09, Forrest 3044 (holotype, E!).

A. huizeense T. L. Ming in Acta Bot. Yunnan. 7: 301, fig. 1: 1-7. 1985. Type: China. Yunnan (云南): Huize (会泽), Y. Q. Liu (刘玉青) 81-01 (holotype, KUN!).

多年生草本,高40-80 cm。块根长条形。茎疏被反曲而紧贴的短柔毛,中部密生叶。茎下部叶在开花时枯萎,中部叶有短柄;叶片卵形或圆五角形,长3.5-6 cm,宽3.6-8 cm,三全裂,裂片极细,中央裂片宽菱形,二回近羽状细裂,小裂片条形,两面无毛或背面沿脉疏被短毛;叶柄长1-2 cm。总状花序有多数密集的花;轴和花梗密被弯曲而紧贴的短柔毛,或被开展的短柔毛;苞片叶状;花梗稍短,长1-2.5 cm;小苞片生于花梗中部或上部;萼片蓝紫色,外面疏被柔毛,上萼片盔形或盔状船形,高2-3 cm,自基部至喙长2-2.5 cm,下缘斜向上展,具短喙;花瓣无毛,距短,向后弯曲;花丝疏被短毛,全缘或有2枚小齿;心皮5,子房密被黄色长柔毛。花期9-10月。

分布:四川西南部,云南东北部和西北部。

38a. 短柄乌头 原变种

var. **brachypodum**

本变种的花序轴和花梗密被弯曲而紧贴的短柔毛。

分布:四川西南部,云南西北部。

Sichuan (四川): Butuo (布拖), Liangshan Med. Pl. (凉山中草药) 0734 (MS); Muli (木里), S. K. Wu (武素功) 2714 (KUN), Qinghai-Xizang Exped. (青藏队) 14262 (PE, KUN); Ningnan (宁南), Ningnan Division (宁南组) 951 (MS); Puge (普格), Puge Division (普格队) 815 (MS); Yanbian (盐边), T. T. Yu (俞德浚) 1706, 1707 (PE, NAS); Yanyuan (盐源), Handel-Mazzetti 5512 (WU), Yanyuan Division (盐源组) 654 (MS). **Yunnan** (云南): Huize (会泽), Y. Q. Liu (刘玉青) 81-01 (KUN); Lijiang (丽江), Forrest 3044 (E), Handel-Mazzetti 4109 (WU), R. C. Ching (秦仁昌) 30721, 31052, T. T. Yu (俞德浚) 15578, W. T. Wang (王文采) 166 (KUN), Q. E. Yang (杨亲二) 8937 (KUN); Qiaojia (巧家), S. Z. Yang (杨声智) s.n.

(KUN); Without precise locality, Forrest 28565, 30665, 30668, 30670.

38b. 展毛短柄乌头 变种

var. **laxiflorum** Fletcher & Lauener in Not. Bot. Gard. Edinb. 20: 199. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 315. 1979; L. Q. Li & Kadota in Fl. China 6: 219. 2001. Type: China. Sichuan (四川): Muli (木里), Forrest 16991 (holotype, E!).

与原变种的区别是花序被开展的短柔毛。

分布:四川西南部,云南东北部和西北部。

Sichuan (四川): Muli (木里), Muli Division (木里队) 645 (M, MS), Muli Division (木里队) 703 (MS); Zhaojue (昭觉), Sichuan Med. Inst. (四川中药研究所) 12 (MS). **Yunnan** (云南): Dongchuan (东川), C. R. Yang (杨崇仁) 7522 (KUN); Huize (会泽), Dongchuan Division (东川队) 63009 (KUN); Luquan (禄劝), Y. P. Chang (张英伯) 593 (KUN); Zhongdian (中甸), K. M. Feng (冯国楣) 2289 (KUN).

39. 镰形乌头 图30:A-C

Aconitum falciforme Hand.-Mazz. in Acta Hort. Gotob. 13: 94. 1939, p.p. excl. pl. Yunnan; W. T. Wang in Fl. Reip. Pop. Sin. 27: 306, pl. 64, figs. 6-8. 1979; L. Q. Li & Kadota in Fl. China 6: 216. 2001. Type: China. Sichuan (四川): Garzê (甘孜), alt. 4500 m, 1914-07-27, Limpricht 2090 (holotype, WU!).

A. napellus L. var. *sessiliflorum* Finet & Gagnep. in Bull. Soc. Bot. Fr. 51: 513. 1904, p.p. excl. pl. Inner Mongolia. ——*A. rotundifolium* var. *sessiliflorum* (Finet & Gagnep.) Rapaics in Növ. Közl. 6: 163. 1907. ——*A. sessiliflorum* (Finet & Gagnep.) Hand.-Mazz. in Acta Hort. Gotob. 13: 88. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 315, pl. 73, figs. 7-9. 1979; L. Q. Li & Kadota in Fl. China 6: 220. 2001, syn. nov. Type: China. Sichuan (四川): Kangding (康定), 1891-10, Soulié 358 (syntype, P!); Sichuan (四川): Kangding (康定), 1897, Mussot 24 (syntype, P!); Sichuan (四川): Batang (巴塘), 1903-10, Soulié 3034 (syntype, photo, PE!).

多年生草本,高20-80 cm。茎上部有稀疏短伏毛。茎下部叶在开花时枯萎,中部叶有稍长柄,上部叶有短柄,叶等距排列;叶片圆五角形,长2.5-5.5 cm,宽3.6-6 cm,三全裂,裂片细,中央全裂片宽菱形,二回羽状深裂,末回裂片条形;叶柄长2-4.5 cm。总状花序顶生,长4-8 cm,有5-10朵密集的花;轴和花梗密被反曲而紧贴的短柔毛;下部苞片叶状,上部条形;小苞片生花梗中部,线形;花梗短,长约0.5 cm;萼片蓝紫色,外面无毛,上萼片盔形或盔状船形,有皱折,高1.5-1.8 cm,自基部至喙长1.5-2 cm,下缘斜向上展,稍凹;花瓣无毛,距长约1 mm,向内弯曲;花丝无毛或疏被短毛,全缘;心皮5,子房密被短伏毛。花期8-9月。

分布:四川西部。

Sichuan (四川): Baoxing (宝兴), Wilson 1998 (K); Danba (丹巴), Chengdu Med. Sta. (成都中药材站) s.n. (M); Garzê (甘孜), Limpricht 2090 (WU), Y. M. Sun (孙跃明) 6746; Kangding (康定), H. L. Tsiang (蒋兴麟) 36585 (PE, SZ), C. S. Liu (刘振书) 13569 (PE, SZ), 1184, Handel-Mazzetti 11566, K. C. Kuan & W. T. Wang (关克俭,王文采) 1123; Litang (理塘), G. Yao (姚淦) 357, 362 (NAS); Xiaojin (小金), Y. Luo & Y. B. Luo (罗艳,罗毅波) 396, 400; Yajiang (雅江), Y. Luo & Y. B. Luo (罗艳,罗毅波) 372; Without precise locality, Legendre

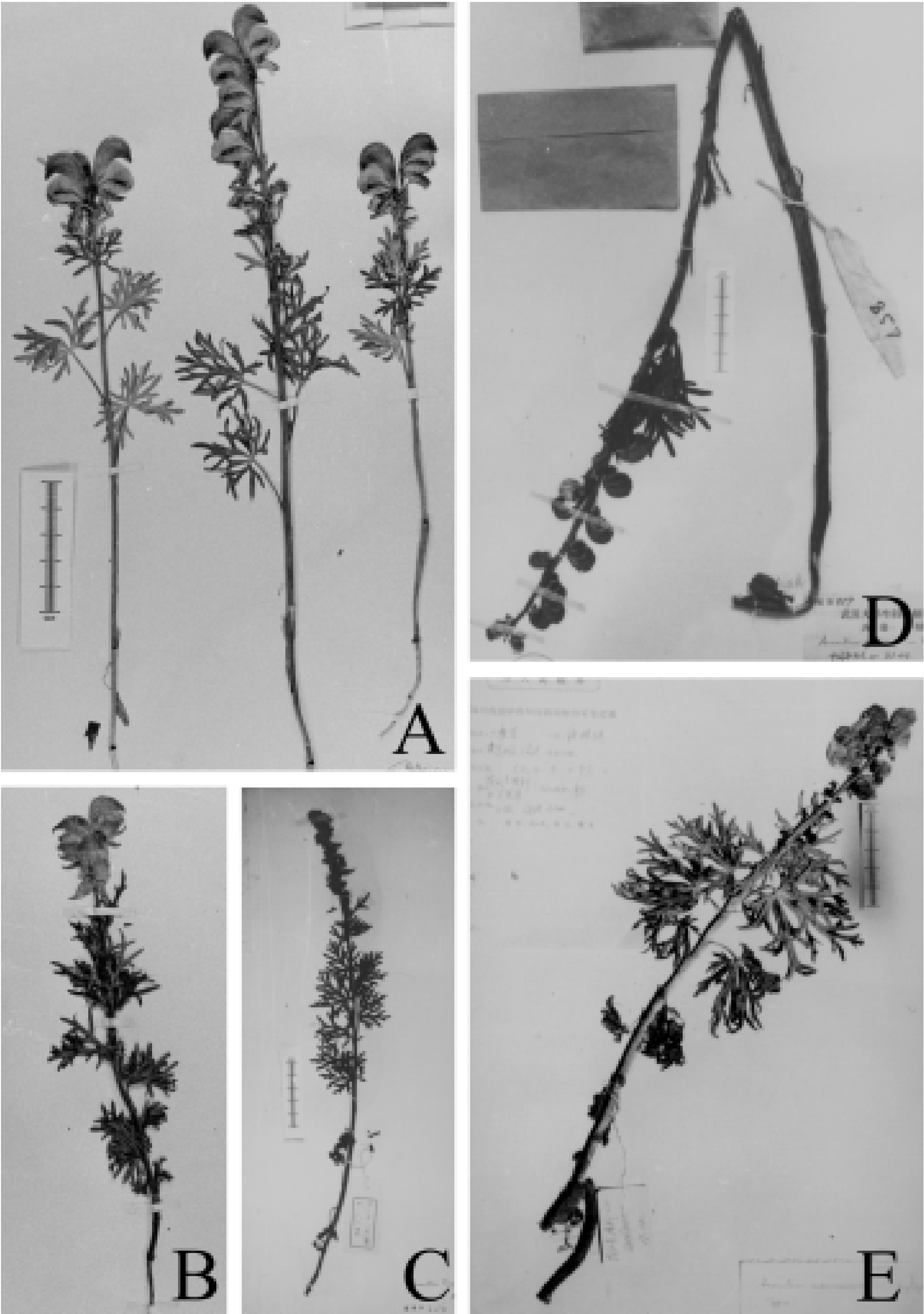


图30　A-C, 镰形乌头　A. 四川宝兴,Wilson 1998 (K,副模式)。B. 四川甘孜, Limpricht 2090 (WU,主模式)。C. 四川理塘,姚淦357 (NAS)。D, E. 无毛乌头。D. 四川康定, 周鹤昌857 (NAS,主模式)。E. 四川茂县,吕利泉、王富强37 (M, *Aconitum maowenense* W. T. Wang的主模式)。

Fig. 30.　**A-C,** *Aconitum falciforme* Hand.-Mazz.　**A,** Baoxing, Sichuan, Wilson 1998 (K, paratype). **B,** Garzê, Sichuan, Limpricht 2090 (WU, holotype). **C,** Litang, Sichuan, G. Yao 357 (NAS). **D, E,** *A. glabrisepalum* W. T. Wang. **D,** Kangding, Sichuan, H. C. Chow 857 (NAS, holotype). **E,** Sichuan, Mao Xian, L. Q. Lü & F. Q. Wang 37 (M, holotype of *A. maowenense* W. T. Wang).

1538 (P), Wilson 3102 (K).

本种是Handel-Mazzetti(1939)根据采自四川甘孜的一份标本Limpricht 2090(图30:B)描述的,这份标本很小,不完整,只有茎的上部分和花序。他还引证了另外3份其他标本,分别为采自四川的标本Legendre 1538、Wilson 1998(图30:A)和采自云南的Forrest 11249。经查看发现Forrest 11249应为丽江常见的直缘乌头*A. transsectum* Diels,而其他采自四川的标本确实为同一物种。Fletcher和Lauener(1950)在研究爱丁堡皇家植物园标本馆的中国乌头属植物时,由于对Handel-Mazzetti的种没有进行深入分析,没有理解此种的形态特征,把四川木里和云南中甸产的缺刻乌头都鉴定为本种。这样该种的概念就一直模糊不清,因此各大植物标本馆长期以来都未能鉴定出本种。我们在川西考察时,发现该种在这些地区很常见,它的外观体态接近于短柄乌头,花较大,花瓣的形态和子房被毛的特征都很接近短柄乌头,但是它的叶具较长的柄并且不聚生,在后者叶柄极短聚集生于茎中部。《中国植物志》根据本种的叶具稍长柄而置于前一个系兴安乌头系里,但我们根据本种的叶形和花部特征认为应该将其置于此系。

缩梗乌头*A. sessiliflorum* (Finet & Gagnep.) Hand.-Mazz.在《中国植物志》记载仅在四川康定至若尔盖附近分布,我们查看了这一带的标本,发现它们与镰形乌头的关系较近,我们查看到的缩梗乌头的合模式中的采自康定的Soulié 358、Mussot 24和巴塘的Soulié 3034也属于这一类植物,因此将它归并。Finet和Gagnepain(1904)在发表*A. napellus* var. *sessiliflorum*(后来被Handel-Mazzetti提升到种的等级,即*A. sessiliflorum*)时还提及了Potanin采自内蒙的标本,我们没有查看到。从地理分布来看,内蒙产的标本不应该属于本种。

40. 会理乌头

Aconitum huiliense Hand.-Mazz., Symb. Sin. 7: 289, fig. 5: 2; t. 6, fig. 3. 1931; et in Acta Hort. Gotob. 13: 88. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 198. 1979; L. Q. Li & Kadota in Fl. China 6: 173. 2001. Type: China. Sichuan (四川), Huili (会理), Mt. Longzhoushan (龙舟山), in scrub, alt. 3550 m, 1914-09-17, Handel-Mazzetti 5198 (holotype, WU!).

多年生草本,高50-100 cm。茎上部密被短柔毛。基生叶无,茎生叶下部排列稀疏,具长柄,上部叶稍密集,具较短柄;叶片圆五角形,直径达8 cm,基部心形,三全裂,中央裂片宽菱形,二回深裂,末回裂片线形或线状披针形,无毛或疏被短伏毛;下部叶柄比叶片长约3倍,具狭鞘,上部叶柄渐变短,无鞘。总状花序有10-20朵花;下部苞片叶状,上部的渐变小,卵形,长约1 cm;花梗长1.5-3 cm,被开展毛;小苞片生花梗中部之上,长圆形;萼片蓝紫色,被短柔毛,上萼片船状盔形,下缘斜向上;花瓣无毛,距短几不存在;雄蕊无毛,花丝有2枚小齿;心皮5,子房密被黄色硬毛。花期9-10月。

分布:四川会理、米易。

Sichuan (四川): Huili (会理), Handel-Mazzetti 5198 (WU), X. C. Zhang (张宪春) 2460; Miyi (米易), Liangshan Inst. Drug Control (凉山州药品检验所) s.n. (M, MS), Y. Luo & Y. S. Chen (罗艳,陈又生) 553。

本种自Handel-Mazzetti(1931)发表后,采集到的标本很少,我们在中国医学科学院药物研究所标本馆和重庆中药研究院标本馆发现了几份本种的标本,但被鉴定为展毛短柄乌

头,二者确实很相似,它们具有相似的花形态、叶形和花梗毛被,只是本种叶具较长的叶柄,花瓣距短或无而与后者区别,在后者,叶柄较短,花瓣一般都有距。王文采认为本种的花瓣无距,将其置于保山乌头系中,但我们认为它与短柄乌头的关系更近,故将本种放入短柄乌头系中。下面讨论的种——凉山乌头*A. liangshanicum* W. T. Wang也是这种情况。

41. 凉山乌头

Aconitum liangshanicum W. T. Wang in Acta Phytotax. Sin. Addit. 1: 86, pl. 6, fig. 21. 1965; et in Fl. Reip. Pop. Sin. 27: 300, pl. 67, figs. 5-7; pl. 74: 2. 1979; L. Q. Li & Kadota in Fl. China 6: 214. 2001. Type: China. Sichuan (四川): Yuexi (越西), alt. 4300-4500 m, 1960-09-20, Sichuan Med. Pl. Exped. (四川药源队) 25373 (holotype, MS!; isotype, NAS!).

A. pseudohuiliense Chang ex W. T. Wang in Acta Phytotax. Sin. Addit. 1: 93. 1965; et in Fl. Reip. Pop. Sin. 27: 199, pl. 36, figs. 5, 6. 1979; L. Q. Li & Kadota in Fl. China 6: 174. 2001, syn. nov. Type: China. Sichuan (四川): Leibo (雷波), alt. 3760 m, 1934-09-21, T. T. Yu (俞德浚) 4013 (holotype, PE!).

A. jinyangense W. T. Wang in Bull. Bot. Lab. North-East Forest. Inst. 8 (8): 18, fig. 2: 2. 1980; L. Q. Li & Kadota in Fl. China 6: 174. 2001, syn. nov. Type: China. Sichuan (四川): Jinyang (金阳), grassy slope, 1978-08-20, C. S. Li (李传仕) s.n. (holotype, M!; isotype, PE!).

多年生草本,高40-60 cm。块根倒圆锥形或胡萝卜形。茎疏被反曲而紧贴的短柔毛。茎生叶下部排列稀疏,具长柄,上部叶稍密集,具较短柄;叶片五角形,长3.5-7.5 cm,宽4.5-11.5 cm,基部心形,三全裂,中央裂片菱形,二回裂片细裂,末回裂片线形或披针形,两面无毛;叶柄长2-6 cm,无毛或近无毛。总状花序长4-8 cm,有6-12朵花;轴和花梗密被弯曲而紧贴的短柔毛;下部苞片叶状,上部苞片倒披针形或匙形;花梗长0.7-3 cm;小苞片生于花梗中部之上,线形或钻形;萼片蓝紫色,外面疏被短柔毛,上萼片船状盔形,下缘直;花瓣被稀疏短柔毛,有短距或近无;花丝疏被柔毛,全缘或有2枚小齿;心皮5,子房密被紧贴的短柔毛。花期8-9月。

分布:四川西南部。

Sichuan (四川): Jinyang (金阳), C. S. Li (李传仕) s.n. (M, PE), Anonymous 699 (MS); Leibo (雷波), T. T. Yu (俞德浚) 4013; Meigu (美姑), B. S. Zeng & T. G. Pan (曾本松,潘太国) 19-27; Mianning (冕宁), Mianning Division (冕宁队) 434 (MS), Sichuan Med. Inst. (四川中药研究所) 182 (MS), Y. Luo & Y. S. Chen (罗艳,陈又生) 450; Puge (普格), Sichuan Med. Pl. Exped. (四川药源队) 25027 (MS); Xide (喜德), Anonymous 931 (MS); Yuexi (越西), Sichuan Med. Pl. Exped. (四川药源队) 25373 (MS, NAS), 26741 (MS), Yuexi Division (越西队) 807 (M); Zhaojue (昭觉), Liangshan Med. Pl. (凉山中草药) 683 (MS).

本种主要分布于四川西南部的大凉山地区,与会理乌头的体态很相似。本种由于茎下部叶具长柄,在以前的分类处理中往往把它置于兴安乌头系中(王文采,1979),但从叶形及花部特征等性状来看,应该与短柄乌头系的种类近缘。本种在花瓣的距的形态上有一定的变异。王文采主要根据距的不同发表了凉山乌头*A. liangshanicum*、雷波乌头*A. pseudohuiliense*和金阳乌头*A. jinyangense*。据他的描述, 凉山乌头有1.5 mm长的向后弯的短距,后二者都是无距的。我们查看凉山乌头的模式标本时,它的一份等模式标本中的花瓣

的距就有变化,一个无距,另一个有短距。我们在野外也观察到了这种情形。凉山乌头的模式标本的花还未成熟,花的特征不可靠,但从体态和地理分布来看,也应属于凉山乌头。因此我们建议三者合并并采用*A. liangshanicum*这一名称。

42. 无毛乌头 图30:D,E

Aconitum glabrisepalum W. T. Wang in Fl. Reip. Pop. Sin. 27: 611. 1979; et in l.c. 27: 317, pl. 76, figs. 8, 9. 1979; L. Q. Li & Kadota in Fl. China 6: 220. 2001. Type: China. Sichuan (四川): Kangding (康定), on mountain slope, 1939-09-09, H. C. Chow (周鹤昌) 857 (holotype, NAS!).

A. maowenense W. T. Wang in Bull. Bot. Lab. North-East Forest. Inst. 8 (8): 21. 1980; L. Q. Li & Kadota in Fl. China 6: 216. 2001, syn. nov. Type: China. Sichuan (四川): Mao Xian (茂县), alt. 4200 m, 1979-09-16, L. Q. Lü & F. Q. Wang (吕利泉, 王富强) 37 (holotype, M!).

A. refractum auct. non (Finet & Gagnep.) Hand.-Mazz.: Hand.-Mazz. in Acta Hort. Gotob. 13: 94. 1939, p.p., quoad Soulié 2029.

多年生草本,高40-60 cm。块根胡萝卜形。整个植株无毛,茎下部叶在开花时枯萎,茎中部生有较密集的叶,具稍长柄或短柄;叶片圆五角形,长3.8-5 cm,宽5.5-6.5 cm,三全裂,中央全裂片宽菱形,二至三回细裂,小裂片稀疏,线形;叶柄长0.5-2.5 cm。总状花序长约20 cm,有4-10朵花,排列稀疏或紧密;下部苞片叶状,上部苞片线形;花梗较短,长约0.5 cm;小苞片生花梗上部;萼片蓝紫色,上萼片船状盔形或船形,高1.2-1.4 cm,自基部至喙长1.2-1.4 cm,下缘凹;花瓣无毛,距长约1.5 mm,向内弯曲;雄蕊无毛,花丝全缘;心皮5,无毛。花期8-9月。

分布:四川西部、西南部。

Sichuan (四川): Kangding (康定), H. C. Chow (周鹤昌) 857 (NAS), Anonymous 493 (M, NAS); Luding (泸定), Sichuan Veg. Exped. (四川植被队) 31346 (CDBI); Mao Xian (茂县), L. Q. Lü & F. Q. Wang (吕利泉,王富强) 37 (M); Muli (木里), L. H. Liu et al. (刘伦辉等) s.n., Q. S. Zhao (赵清盛) 6423 (CDBI, SZ)。

本种全株无毛而易与近缘种相区别(图30:D,E)。

43. 多裂乌头

Aconitum polyschistum Hand.-Mazz. in Acta Hort. Gotob. 13: 100. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 317, pl. 73, figs. 1-3. 1979; L. Q. Li & Kadota in Fl. China 6: 220. 2001. Type: China. Sichuan (四川): Barkam (马尔康), alt. 3200 m, 1922-09-25, H. Smith 4518 (holotype, W; isotype, PE!).

A. brachypodum var. *crispulum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 97. 1965; et in Fl. Reip. Pop. Sin. 27: 315. 1979; L. Q. Li & Kadota in Fl. China 6: 219. 2001, syn. nov. Type: China. Sichuan (四川): Jinchuan (金川), alt. 3700 m, 1958-08-23, H. Li (李馨) 78492 (holotype, PE!; isotype, NAS!).

多年生草本,高50-100 cm。块根近纺锤形。茎稍粗,疏被反曲而紧贴的短柔毛,等距离着生叶,常有分枝。茎下部叶有稍长柄,茎中部叶有短柄;叶片卵形,分裂极细,似茴香叶,长6-8 cm,宽5-8 cm,中央全裂片卵形,近羽状细裂,末回裂片极狭条形,两面无毛;下部叶柄长约2 cm,中上部叶柄长约0.5 cm。顶生总状花序狭长,长15-28 cm,有多数密集的花,有时在

花序轴下部有侧生花序;轴和花梗密被反曲的短柔毛;下部苞片叶状,其他的线形;顶生花序花梗较短,长约1 cm,通常侧生花序的花梗较长,长2-3 cm;小苞片生花梗中部之上,线形;萼片蓝紫色,外面密被短柔毛,上萼片盔状船形,高0.8-1.2 cm,自基部至喙长1.5-1.7 cm,下缘向上斜伸,凹;花瓣无毛,距短,稍向后弯;花丝被短柔毛,全缘;心皮3-5,子房密被紧贴的短柔毛。种子倒卵状三棱形,沿棱具狭翅。花期8-10月。

分布:四川西部。

Sichuan (四川): Barkam (马尔康), Smith 4518, C. T. Ting et al. (丁志遵等) 131 (NAS), Anonymous 23358 (NAS), H. Li (李馨) 72271, 72357, 72479, J. S. Yue & G. J. Song (岳俊三, 宋国杰) 64028; Jinchuan (金川), H. Li (李馨) 78492 (PE, NAS), J. D. Li & Z. M. Xu (李九丹,徐智明) 75 (M); Li Xian (理县), Z. R. Zhang & H. F. Zhou (张泽荣,周洪富) 23799 (PE, NAS)。

本种与伏毛铁棒锤近缘,叶分裂极细而与之区别。

44. 伏毛铁棒锤

Aconitum flavum Hand.-Mazz. in Acta Hort. Gotob. 13: 86. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 318, pl. 74, fig. 9; pl. 75, figs. 1-5. 1979; L. Q. Li & Kadota in Fl. China 6: 221. 2001. Type: China. W China: Without precise locality, alt. 3050 m, 1903-08, Wilson 3104 (holotype, K!; isotype, K!).

A. anthora L. var. *gilvum* Maxim. in Fl. Tang., 25. 1889. ——*A. gilvum* (Maxim.) Hand.-Mazz. in l.c.: 86. Type: China. Gansu (甘肃): Pingfan, river side, Trippner 150 (holotype, LE).

多年生草本,高35-100 cm。块根胡萝卜形。茎中部以下无毛,在中部或上部被反曲而紧贴的短柔毛,中部密生叶。茎下部叶在开花时枯萎,中部叶有短柄;叶片宽卵形,长3.8-5.5 cm,宽3.6-4.5 cm,基部浅心形,三全裂,全裂片细裂,末回裂片线形,两面无毛;叶柄极短,长3-4 mm。花序顶生,有时在花序下部有侧生的花序分枝,有多数密集的花;轴和花梗密被紧贴的短柔毛;下部苞片叶状,其他苞片线形;花梗较短,长4-8 mm;小苞片通常生于花梗上部;萼片黄色带绿色、紫色或深紫色,外面被短柔毛,上萼片盔状船形,船形或镰形,高1.2-1.6 cm,自基部至喙长1.5-2 cm,下缘斜向上展,上部稍凹;花瓣疏被短毛,距长约1 mm,向后弯曲;花丝无毛或疏被短毛,全缘;心皮5,无毛或被短毛。种子倒卵状三棱形,沿棱具狭翅。花期8-9月。

分布:四川西北部,西藏北部,青海,甘肃,宁夏南部,陕西,内蒙古南部。

Gansu (甘肃): Lanzhou (兰州), Y. Q. He (何叶祺) 5667; Min Xian (岷县), T. P. Wang (王作宾) 7688, 7686; Shandan (山丹), S. J. Han (韩属俊) 621149 (NAS); Têwo (迭部), Rock 13722 (PE, E), Rock 13735; Tianzhu (天祝), C. X. Nie (聂朝相) 63086 (NAS); Xiahe (夏河), T. P. Wang (王作宾) 5731, K. T. Fu (傅坤俊) 1493, Q. E. Yang (杨亲二) 92034; Yongdeng (永登), Q. E. Yang (杨亲二) 92036; Yuzhong (榆中), Yellow River Exped. (黄河队) 3134, 3326; Without precise locality, R. C. Ching (秦仁昌) 921 (E), Przewalski 255 (E). **Nei Mongol** (内蒙古): Hohhot (呼和浩特), Y. W. Tsui (崔友文) 1284. **Ningxia** (宁夏): Jingyuan (泾源), Jingyuan Exped. (泾源队) 0035. **Qinghai** (青海): Datong (大通), K. M. Liou (刘继

孟) 6627; Huzhu (互助), J. S. Yang (杨竞生) 91-866; Menyuan (门源), K. M. Liou (刘继孟) 6810, 6984, 7130; Qilian (祁连), P. C. Tsoong (钟补求) 8554; Xunhua (循化), Q. E. Yang (杨亲二) 9501. **Shaanxi** (陕西): Foping (佛坪), P. C. Kuo (郭本兆) 1743. **Sichuan** (四川): Dêgê (德格), S. X. Jia (贾慎修) 193; Heishui (黑水), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 1391; Mao Xian (茂县), Maowen Division (茂汶组) 2513; Nanping (南坪), Y. C. Tang et al. (汤彦承等) 111, Sichuan Econ. Pl. Exped. (四川经济植物调查队) 4121 (CDBI); Sêrtar (色达), Z. S. Yu (虞泽生) 6661 (PE, CDBI); Songpan (松潘), W. P. Fang (方文培) 4272, K. T. Fu (傅坤俊) s.n., F. T. Pu et al. (溥发鼎等) 59 (CDBI); Zoigê (若尔盖), J. L. Yang & G. H. Yang (杨俊良,杨光辉) 64246; Without precise locality, Wilson 3104 (K). **Xizang** (西藏): Biru (比如), D. D. Tao (陶德定) 11181; Gêrzê (改则), F. C. Li (李发重) 038; Without precise locality, E Xizang (西藏东部), Rock 13363 (E).

45. 铁棒锤

Aconitum pendulum Busch in Bull. Jard. Bot. St.-Pétersb. 5: 135. 1905; W. T. Wang in Fl. Reip. Pop. Sin. 27: 319, pl. 74, figs. 7, 8; pl. 75, figs. 6, 9. 1979; L. Q. Li & Kadota in Fl. China 6: 221. 2001. Type: unknown.

A. szechenyianum Gáy. in Mag. Bot. Lap. 5: 127. 1909; Hand.-Mazz. in Acta Hort. Gotob. 13: 87. 1939; Icon. Corm. Sin. 1: 693, fig. 1386. 1972; Fl. Tsingling. 1 (2): 262, fig. 224. 1974. Type: unknown.

多年生草本,高30-100 cm。块根倒圆锥形。茎上部疏被短柔毛,中部密生叶。茎下部叶在开花时枯萎,其余叶具短柄或几无柄;叶片宽卵形,长3.5-5.5 cm,宽4.5-5.5 cm,三全裂,全裂片细裂,末回裂片线形,两面无毛;叶柄长3-4 mm。总状花序顶生,长8-20 cm,有较多密集的花;轴和花梗密被伸展的黄色或白色短柔毛;下部苞片叶状,上部苞片线形;花梗短,长2-6 mm;小苞片生于花梗上部,披针状线形;萼片黄绿色、深紫红色、淡紫色或淡兰色,外面被短柔毛,上萼片船形或镰形,高0.8-1.2 cm,自基部至喙长1.5-2 cm,下缘弧状弯曲;花瓣无毛或疏被柔毛,距长约1 mm,向后弯曲;花丝无毛或疏被短毛,全缘;心皮5,无毛或子房被短柔毛。种子倒卵状三棱形,沿棱生不明显的狭翅。花期7-9月。

分布:四川西部,重庆,云南西北部,西藏,青海,甘肃南部,陕西南部,河南西部及湖北。

Chongqing (重庆): Wuxi (巫溪), Sichuan Med. Inst. (四川中药研究所) 35 (MS), G. H. Yang (杨光辉) 59453 (PE, CDBI), K. L. Chu (曲桂龄) 2062 (PE, NAS). **Gansu** (甘肃): Min Xian (岷县), Q. E. Yang (杨亲二) 92002; Subei (肃北), P. C. Kuo (郭本兆) 3416. **Henan** (河南): Lushi (卢氏), B. Z. Ding (丁宝章) 23003, K. M. Liou (刘继孟) 5220. **Hubei** (湖北): Shennongjia (神农架), Anonymous 2788. **Qinghai** (青海): Gonghe (共和), P. C. Kuo & W. Y. Wang (郭本兆,王为义) 12021; Huzhu (互助), P. C. Kuo (郭本兆) 9394; Tianjun (天俊), Z. W. Chang (张珍万) 2352; Yushu (玉树), Anonymous 398; Zadoi (杂多), S. W. Liu (刘尚武) 335. **Shaanxi** (陕西): Mt. Taibaishan (太白山), Licent 2876 (K), P. C. Kuo (郭本兆) 1743, T. N. Liou & P. C. Tsoong (刘慎谔,钟补求) 813; Yang Xian (洋县), J. X. Yang (杨金祥) 1677. **Sichuan** (四川): Barkam (马尔康), H. Li (李馨) 72095, 72173, 72216; Batang (巴塘), Batang Division (巴塘队) 4321 (PE, CDBI); Beichuan (北川), Beichuan Division (北川队) 334

(MS); Daocheng (稻城), Sichuan Veg. Exped. (四川植被队) 3844 (PE, CDBI), Qinghai-Xizang Exped. (青藏队) 5145 (CDBI), Y. Luo & Y. B. Luo (罗艳,罗毅波) 411; Dawu (道孚), Y. Luo & Y. B. Luo (罗艳,罗毅波) 352; Hongyuan (红原), X. M. Liu (刘雪明) 25, B. C. Ni (倪炳炽) 333 (CDBI), Sichuan Pl. Coll. Record (四川植物采集记录) 10408; Jinchuan (金川), The 8th Forest Management Brigade (第八森林经理大队) 4643, Sichuan Veg. Exped. (四川植被队) 9946, 9951a, 9952, 9946 (CDBI); Li Xian (理县), H. Li (李馨) 74381,Y. Luo & Y. B. Luo (罗艳,罗毅波) 322; Mao Xian (茂县), S. Y. Chen (陈善墉) 5959 (NAS); Sêrxü (石渠), Q. Q. Wang (王清泉) 7586 (PE, CDBI), Garzê Pl. (甘孜州植物) 153; Songpan (松潘), P. L. Wang (王萍莉) 1408, Wilson 4520, 4521 (K); Xiangcheng (乡城), Sichuan Veg. Exped. (四川植被队) 1488 (CDBI), 1219, 3198 (PE, CDBI), Qinghai-Xizang Exped. (青藏队) 4617, 5084 (CDBI), Y. Luo & Y. B. Luo (罗艳,罗毅波) 413; Yajiang (雅江), Y. Luo & Y. B. Luo (罗艳,罗毅波) 368. **Xizang** (西藏): Amdo (安多), D. D. Tao (陶德定) 10757 (PE, KUN); Baxoi (八宿), Qinghai-Xizang Exped. (青藏队) 73-1238 (PE, KUN); Biru (比如), D. D. Tao (陶德定) 11389 (PE, KUN); Nagqu (那曲), D. D. Tao (陶德定) 10845 (PE, KUN); Qamdo (昌都), Qinghai-Xizang Exped. (青藏队) 12675, 12774; Sog Xian (索县), D. D. Tao (陶德定) 11026. **Yunnan** (云南): Zhongdian (中甸), Forrest 16894 (E), T. T. Yu (俞德浚) 13475 (PE, KUN), K. M. Feng (冯国楣) 23397 (KUN), S. W. Yu (俞绍文) 62003 (KUN), W. G. Huang (黄伟光) 62-203 (KUN), Z. W. Lü (吕正伟) 321 (KUN), J. S. Yang (杨竞生) 84-945, Q. E. Yang (杨亲二) 8903, 8911 (KUN); Without precise locality, Forrest 13351.

亚属**3.** 露蕊乌头亚属

Subgen. 3. **Gymnaconitum** (Stapf) Rapaics in Növ.Közl. 6: 139. 1907. ——Sect. *Gymnaconitum* Stapf in Ann. Bot. Gard. Calc. 10: 178. 1905.

根为一年生的直根。叶掌状全裂,一回裂片细裂。萼片有长爪;上萼片船形。花瓣的瓣片顶部有分泌组织,无距,唇大,扇形,边缘有小齿。心皮6-13。

1种,分布于青藏高原。

46. 露蕊乌头

Aconitum gymnandrum Maxim. in Bull. Acad. Sci. St.-Pétersb. 23: 308. 1876; Fl. Tang. 26, t. 6, figs. 1-6. 1889; Brühl in Ann. Roy. Bot. Gard. Calc. 5: 113. 1896; Stapf in Ann. Roy. Bot. Gard. Calc. 10: 178, pl. 115. 1905; Hand.-Mazz. in Acta Hort. Gotob. 13: 84. 1939; W. T. Wang in Acta Phytotax. Sin. Addit. 1: 97. 1965; Icon. Corm. Sin. 1: 698, fig. 1396. 1972; Fl. Tsingling. 1 (2): 263. fig. 225. 1974; W. T. Wang in Fl. Reip. Pop. Sin. 27: 324, pl. 77, figs. 1-3. 1979; L. Q. Li & Kadota in Fl. China 6: 222. 2001. Type: China. Gansu (甘肃): Without precise locality, Przewalski s.n. (holotype, LE; isotype, PE!).

A. gymnandrum f. *leucanthum* W. T. Wang in Acta Phytotax. Sin. Addit. 1: 97. 1965. Type: China. Sichuan (四川): Kangding (康定), alt. 3500 m, 1963-07-21, K. C. Kuan & W. T. Wang (关克俭,王文采) 869 (holotype, PE!).

一年生草本,高20-60 cm。块根近圆柱形。茎被白色短柔毛。基生叶1-3枚,与最下部茎生叶通常在开花时枯萎;叶片宽卵形或三角状卵形,长3.5-6.4 cm,宽4-5 cm,三全裂,全裂

片二至三回羽状深裂,小裂片狭卵形至狭披针形,表面疏被短伏毛,背面沿脉疏被长柔毛或变无毛;下部叶柄长4-7 cm,上部叶柄逐渐变短,具狭鞘。总状花序有6-16朵花;基部苞片叶状,其他苞片披针形至线形;花梗长1-5 cm;小苞片生花梗上部或顶部,叶状至线形;萼片蓝紫色,少有白色,外面疏被柔毛,有较长爪,上萼片浅船形,高1.5-1.8 cm,爪长1.1-1.4 cm,侧萼片卵圆形,长1.4-1.8 cm,瓣片与爪近等长,下萼片与侧萼片相似,较小且短。花瓣爪部被柔毛,唇大扇形,紫色,边缘有小锯齿,距短,几无;花丝疏被短毛,全缘;心皮6-13,子房有柔毛。种子倒卵球形,密生横狭翅。花期6-8月。

分布:四川西部,西藏,青海,甘肃南部。

Gansu (甘肃): Jonê (卓尼), Rock 12183; Li Xian (礼县), Q. X. Li (李全喜) 779; Lintao (临洮), Taohe River Exped. (洮河队) 3303; Min Xian (岷县), T. P. Wang (王作宾) 4833; Sunan (肃南), Hexi Division (河西队) 178; Xiahe (夏河), Q. R. Wang & M. S. Yan (王庆瑞, 晏民生) 10640; Yuzhong (榆中), Yellow River Exped. (黄河队) 3031, 3282; Zhang Xian (漳县), Yellow River Exped. (黄河队) 4635; Without precise locality, Przewalski s.n. **Qinghai** (青海): Huangyuan (湟源), P. C. Tsoong (钟补求) 8862; Qinghai Lake (青海湖), T. T. Yu et al. (俞德浚等) 45; Tianjun (天俊), Qinghai-Gansu Exped. (青甘队) 1039; Tongren (同仁), T. P. Wang (王作宾) 6129; Xining (西宁), K. C. Kuan (关克俭) 77157; Yushu (玉树), Xizang Med. Pl. Exped. (西藏中草药普查队) 1041; Zadoi (杂多), S. W. Liu (刘尚武) 302. **Sichuan** (四川): BaiYu (白玉), P. C. Tsoong (钟补求) 5738, Garzê Pl. (甘孜州植物) 147 (MS); Barkam (马尔康), The 8th Forest Management Brigade (第八森林经理大队) 2355, Z. R. Zhang & H. F. Zhou (张泽荣,周洪富) 22623; Dawu (道孚), Nanshuibeidiao Exped. (南水北调队) 9482, Garzê Pl. (甘孜州植物) 216 (MS), S. Y. Chen (陈善墉) 15788 (MS); Danba (丹巴), The 8th Forest Management Brigade (第八森林经理大队) 2756, Anonymous 2111, T. L. Dai et al. (戴天伦等) 64-2 (MS); Daocheng (稻城), Sichuan Veg. Exped. (四川植被队) 3734; Dêgê (德格), S. X. Jia (贾慎修) s.n., Dêgê Division (德格队) 633 (MS); Garzê (甘孜), Y. W. Tsui (崔友文) 4298, Anonymous 15108 (MS); Kangding (康定), K. C. Kuan & W. T. Wang (关克俭,王文采) 632, 869, 954, 1472, Nanshuibeidiao Exped. (南水北调队) 6412, W. G. Hu & Z. He (胡文光,何铸) 10343; Li Xian (理县), Y. Luo & Y. B. Luo (罗艳,罗毅波) 326; Litang (理塘), Litang Division (理塘队) 315 (MS); Luhuo (炉霍), Nanshuibeidiao Exped. (南水北调队) 9353, Garzê Pl. (甘孜州植物) 228 (MS); Mao Xian (茂县), Maowen Division (茂汶组) 974 (MS); Muli (木里), S. K. Wu (武素功) 2891; Nanping (南坪), Nanping Division (南坪普查队) 1009 (MS); Sêrxü (石渠), Sêrxü Division (石渠队) 790010 (MS); Xiangcheng (乡城), Garzê Pl. (甘孜州植物) 690 (MS); Xinlong (新龙), Xinlong Division (新龙队) 605 (MS); Zoigê (若尔盖), Nanshuibeidiao Exped. (南水北调队) 6835. **Xizang** (西藏): Cona (错那), Z. S. Ren (任再舍) 376; Jomda (江达), Qinghai-Xizang Exped. (青藏队) 12471; Lhasa (拉萨), Y. T. Chang & K. Y. Lang (张永田,郎楷永) 1503; Nagqu (那曲), D. D. Tao (陶德定) 10843; Qamdo (昌都), Z. S. Ren (任再舍) 913, 1211; Riwoqê (类乌齐), Qinghai-Xizang Exped. (青藏队) 12971.

存疑类群(dubious taxa)

1. 密花乌头

Aconitum potaninii Kom. in Rep. Sp. Nov. 13: 234. 1914; Hand.-Mazz. in Acta Hort. Gotob. 13: 99. 1939; W. T. Wang in Fl. Reip. Pop. Sin. 27: 285. 1979; L. Q. Li & Kadota in Fl. China 6: 207. 2001. Type: China. Sichuan (四川): Without precise locality, 1893-08-07, Potanin s.n. (holotype, LE; photo, PE!).

我们仅查看了模式标本的照片。该份标本的产地不甚清楚,Handel-Mazzetti(1939)认为Potanin采的这份标本并非标本记载的西藏,而应为康定一带。从模式照片及原始描述上看,此种叶全裂,一回裂片细,有较多的腋生花序,花序轴和花梗被开展毛。被Handel-Mazzetti定为密花乌头的H. Smith 11737 (PE,采自道孚) 叶形以及毛被的特征都与密花乌头的描述符合,但是H. Smith 11737的上萼片为镰形,应为贡嘎乌头,而从照片来看,Potanin s.n.的盔较高,有较长的喙。

2. Aconitum limprichtii Hand.-Mazz. in Acta Hort. Gotob. 13: 96. 1939. Type: China. Sichuan (四川): Dêgê (德格), alt. 4150 m, 1914-08-10, Limpricht 2157 (holotype).

本种自发表以来,没有再被提及,我们不知道标本的收藏地点,经多次努力也未能查看到其模式标本,只好暂存疑。

3. 疏毛剑川乌头

Aconitum handelianum var. **laxipilosum** Hand.-Mazz. in Acta Hort. Gotob. 13: 93. 1939; L. Q. Li & Kadota in Fl. China 6: 214. 2001. Type: China. Sichuan (四川): N Sichuan, without precise locality, alt. 4100 m, 1922-09, H. Smith 4278 (syntype, W); Kangding (康定), 1894-08-13, Soulié 2392 (syntype, K!); Kangding (康定), alt. 4000 m, 1934-08-26, H. Smith 11564 (syntype, W), 11563 (syntype, MO!); Dawu (道孚), alt. 3900 m, 1934-09-11, H. Smith 12042 (syntype, MO!); Dawu (道孚), alt. 3800 m, 1934-09-01, H. Smith 11804 (syntype, MO!); Dawu (道孚), 1934-08, H. Smith 10691 (syntype, W).

关于疏毛剑川乌头的合模式,我们查看了采自康定的Soulié 2392和采自道孚的H. Smith 12042,11563,它们都属于美丽乌头,但别的标本我们没有见到。鉴于我们没有检查到疏毛剑川乌头的全部合模式,故对其分类处理还要留待以后研究。

致谢 感谢各单位和机构借阅和查看标本,罗毅波和陈又生博士协助野外调查工作,黄姹姹小姐协助绘图,一并致谢。

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